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Vol. 46 December, 1939 No. 3

Effect of the Physical and Chemical Properties of Carbon Black on Its Electrical Resistivity

By G. L. Roberts and E. G. Emmert
United Carbon Co., Inc., Charleston, West Virginia

IN VIEW of the extensive investigations dealing with the influence of the physical and chemical properties of carbon blacks on their suitability for use in various types of commodities, it is surprising that very little data has been presented relative to the property of electrical resistivity.

The property of electrical resistance of carbon black can be classified as being very important from the standpoint of its use as an ingredient in the compounding of rubber insulation stocks, dry cell batteries, radio resistors, and other types of products falling within this category.

Carbon black, itself, is a relatively good conductor and being within this classification presents the possibility of differences that exist in the various grades that are manufactured today by the channel process. These differences, no doubt, are effected by the many properties that carbon black possess, as any one, a combination of some, or all of the different properties extant may well have a definite bearing on their electrical property of resistance.

Investigators have studied and measured the electrical properties of compounds containing carbon blacks and considerable data has been published in the literature giving such values as were obtained by the results of their work. However, within the past ten to fifteen years very meager published information has been presented on measurements made of carbon black as produced by the channel process to evaluate it in regard to its degree of applicability for insulation products.

It has been the general consensus of opinion that the electrical conductance of carbon black was more or less affected by the physical and chemical properties exhibited by the blacks, but neither the magnitude nor the specific effect of any definite property has been given due consideration to ascertain the degree of effect these various properties might evidence.

If these properties do affect the electrical resistivity of carbon blacks to any material degree it would prove to be an important factor from the standpoint of compounding rubber insulation stocks in the selection of a grade or type of channel black that would evidence the

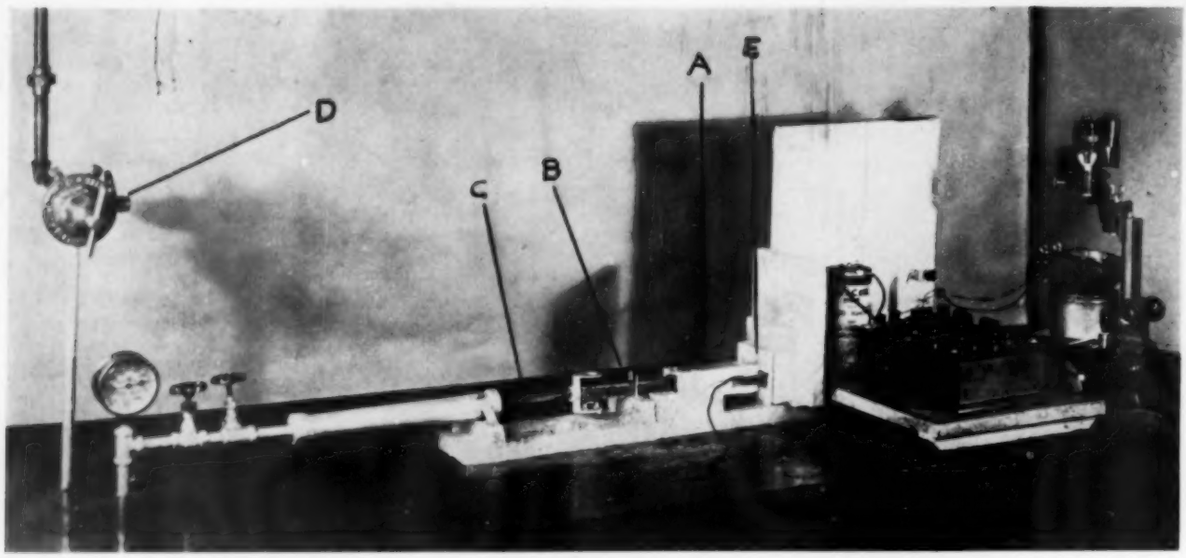


FIG. 1—Apparatus used to evaluate the electrical resistivity of carbon black in powder form.

most desirable properties to meet the needs of a specific requirement. These factors could then be taken into consideration and correlated with the other pertinent physical characteristics which are needed in such types of compounds.

Therefore, the importance exhibited by the property of electrical resistivity which a carbon black may possess and the specific effect which that property may exercise on a product in which the carbon black has been compounded, calls for studies to obtain definite evaluations in respect to the different grades manufactured.

Test Apparatus

To evaluate the property more specifically an apparatus was developed to measure the electrical resistance of carbon black in powder form.

The apparatus designed by this laboratory (see Fig. 1) is composed of a removable cell, A, in which is inserted a ram, B. The ram, B, is worked by air pressure and a plunger, C, so that any definite pressure can be applied to the sample which is placed in the cell, A, for test purposes. The pressure is regulated by a needle type of regulator valve, D, the air line being connected to an air reservoir tank.

Electrodes are inserted in the removable base, E, of test cell, A, and connected with a dry cell battery, which in turn is connected to a Wheatstone Bridge and a millivoltmeter. Observation of the millivoltmeter is made with the aid of binoculars. The apparatus is properly insulated to eliminate any possible leakage. The construction of the electrode attachment, E, with its lead connections, the cell, A, and the ram, B, is shown in Fig. 2.

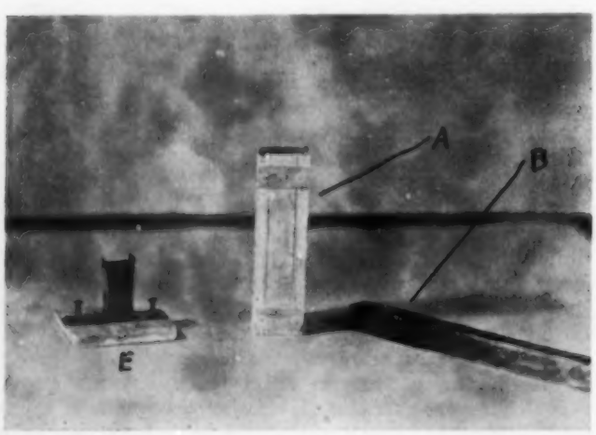


FIG. 2—Construction of the base, the cell, and the ram.

General standardized procedure is used in making the readings obtained on the test. In making the test a known volume of carbon black is placed in the testing cell and the ram inserted. The ram is then pressed down on the carbon black until the known volume previously ascertained is obtained by the established air pressure. The resistance is then immediately recorded in ohms. After each operation the cell and electrodes are thoroughly cleaned to eliminate any possible error by contamination of the succeeding sample to be tested.

Effect of Pressure

In ascertaining the effect of pressure on the electrical resistance value, a sample of carbon black produced by the channel process was subjected to different pressures and the values recorded and plotted. It was determined that pressure exercised a material effect on this value. (See curve in Fig. 3.) The results obtained in the test obviously indicate that a set pressure must be definitely established and standardized to obtain uniform and comparable results.

At zero pressure the sample evidenced a relatively high resistance. A decided drop was obtained in the resistance value of the sample when 10 pounds pressure was applied, indicating that even a light pressure will have an effect on the value. With pressure increased above 10 pounds the resistance gradually decreased, the curve sloping off gradually from 10 pounds to 65 pounds pressure.

Therefore, in view of the results obtained, any point on the curve from 10 to 65 pounds pressure could be established as standard. However, the pressure which is established must be maintained in the running of each individual test. In this work 55 pounds was established as standard for the pressure to be used for all tests. This pressure was established due to it being practically an intermediate point on the curve where the curve had gradually flattened out.

Effect of Particle Size vs. Moisture and Occluded Gases

Five samples of carbon black produced by the channel process and representing a decided difference in their relative particle size, moisture, and amount of occluded gases were tested. Carbon Black *A* represented a relatively large particle size black; Carbon Black *B* was relatively smaller in particle size than Carbon Black *A;* Carbon Black *C* was relatively smaller than Carbon Black *B;* Carbon Black *D* was relatively smaller than Carbon Black *C;* and Carbon Black *E* was the most finely divided of the five samples which were selected for study.

The results obtained on testing the five different samples before devolatilization evidenced wide differences in their electrical resistance. However, no definite trend was established as the values varied to a considerable extent within the grades themselves, these variations in the values being no doubt due to the effect the other properties exercise on the electrical resistant characteristics.

The values obtained on the moisture free samples evidenced that moisture was a definite factor in measuring the electrical resistance of the carbon black as a decrease in the resistance value was obtained in each instance. However, a definite trend was still not established, as the decrease of the electrical resistance did not vary directly with the amount of moisture present. Carbon Black *E,* which contained a greater amount of moisture than the other carbon black samples, *did* evidence a much greater decrease in its electrical resistivity. This would indicate that other properties of carbon black had a greater effect on this specific property.

In the test on the devolatilized samples, a material decrease in resistance was obtained for all the samples, evidencing that the occluded gases were a most important factor in affecting the electrical resistivity of carbon blacks. The degree of decrease in the resistance of the samples evidenced much greater proportions

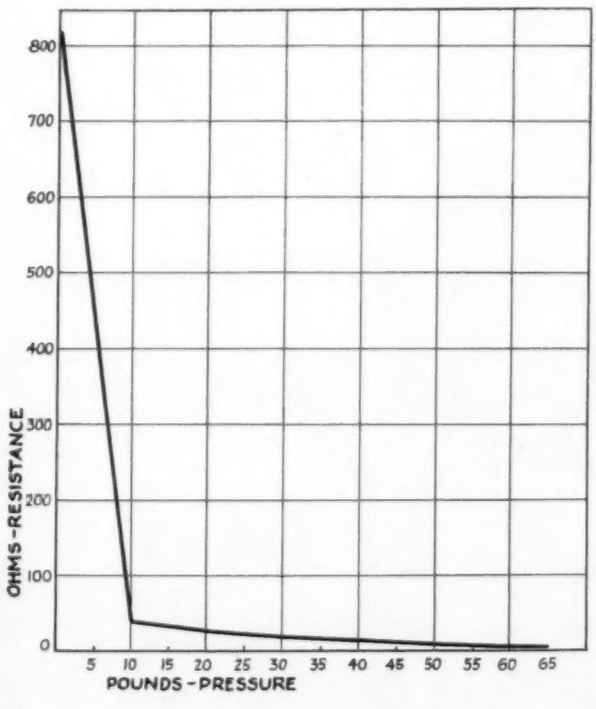


FIG. 3—Ohms-Resistance vs. Pressure.

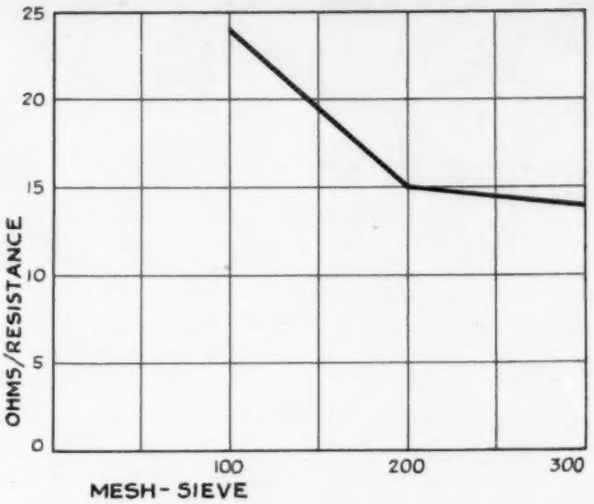


FIG. 4—Ohms-Resistance vs. Aggregate Particles.

with Samples *A. B* and *E* than for Samples *C* and *D.* An explanation that may present itself in this instance is that the constituents of the occluded gas and the different percentage of these constituents might play an active and definite part in the results in evaluating the electrical resistance of the carbon black.

The results disclosed that the relative particle size does exhibit an effect on the electrical resistivity of a carbon black. The larger relative particle size black, *A,* evidenced the least electrical resistance, while *E,* the most finely divided carbon black, offered the greatest resistance. However, the differentiation between the individual samples fell within very narrow limitations.

The small differences obtained in the resistance values may be explained by the fact that when carbon black is heated at high temperatures, such as 950° C., in order to drive off the occluded gases, flocculation of the particles takes place. The agglomerates of the individual particles may vary in size in proportion to the original state of fineness of subdivision, which would no doubt affect the relative decrease in the resistance although the order of resistivity will remain the same. Samples *B, C,* and *D* fall in line on the curve for electrical resistance in the order named. (See Table I).

Effect of Heating vs. Color Value

A sample of carbon black falling in the general range in regard to relative particle size (Sample *C*) was subjected to a heating cycle at different time periods and temperatures. With the gradual decrease in the volatile matter a general decrease in color value and electrical resistivity was obtained. The decrease in the color value was more or less progressive with the increase in the temperature.

This can be explained that by heating a carbon black for varying periods of time and at different temperatures progressive flocculation of the particles takes place, forming large and tightly bound agglomerates, thereby decreasing the intensity of color of the product. The decrease in electrical resistivity of the carbon black follows the same trend as obtained on the completely devolatilized samples. (See Table II).

The values decreased almost proportionally with the decrease in volatile matter, indicating that the constituents of the occluded gases do play an important role in this respect, which is borne out by the data presented in Table I where wide differences were obtained on blacks manufactured under different conditions.

TABLE I

Carbon Blacks	% Moisture	% Occluded Gases	Ohms/Resistance* Containing Original Moisture and Occluded Gases	Moisture Free	Devolatilized
A	2.62	4.76	47.6	42.7	1.9
B	3.05	6.47	62.2	61.5	2.1
C	4.53	7.32	10.7	9.4	2.4
D	9.08	11.78	11.6	10.6	3.7
E	13.40	14.14	43.0	37.2	4.4

* 55 Pounds Pressure Used in Testing.

TABLE II

Time and Temperature	% Volatile Loss	Color Value	Ohms/Resistance*
2 Hrs. at 110°C.	% Moisture—2.64	100.0	7.9
1 Hr. at 250°C.	% Occluded Gases Removed—0.59	93.0	7.1
1 Hr. at 400°C.	% " " " —1.06	83.0	6.5
30 Min. at 550°C.	% " " " —1.99	68.0	5.3
30 Min. at 650°C.	% " " " —3.42	61.0	4.2
30 Min. at 750°C.	% " " " —4.30	58.0	3.4
20 Min. at 850°C.	% " " " —5.12	57.0	2.9
20 Min. at 950°C.	% " " " —6.06	55.0	2.1

* 55 Pounds Pressure Used in Heating.
Note: Fieldner Furnace Method used for Determining Volatile Matter (Occluded Gases).

Effect of Aggregate Particle Size

A sample of carbon black falling at an intermediate point of the range between Carbon Black *B* and Carbon Black *C*, in regard to its relative particle size, was subjected to a dry sifting test in order to separate the aggregate particles. The dry sifting test was conducted on 100, 200 and 300 mesh standardized sieves using a Combs type of Gyratory Riddle at a set time cycle.

Moisture and occluded gases were not taken into consideration for this particular test in order to determine the effect the different size aggregates, themselves, would have upon the property of electrical resistivity. The values obtained indicate that with the smaller size aggregates lower resistivity results were recorded. (See curve in Fig. 4). However, the results which were obtained on previous tests would indicate that the values on testing the aggregates would have very little bearing on the true electrical resistivity of the carbon black.

Test Conclusions

The results indicate that the chemical and physical properties of carbon blacks manufactured by the channel process affect their electrical resistance. In testing carbon blacks for this specific property definite pressure must be used and standardized in order to obtain uniform and comparable results. If the pressure factor is ignored or varied from test to test then wide variation in the values will be obtained even on tests in which the same sample of black is used, and, therefore, this is a very important condition to be observed in the testing procedure for evaluating the electrical resistance of carbon black in the powder form.

The moisture content evidences a definite effect on the electrical property of carbon black. The results demonstrate the error that may be involved if the moisture content of the blacks being tested is not taken into consideration. Due to the fact that carbon black is hygroscopic, variations in the moisture content within certain limitations will be noted. In view of the effect which this property exhibits on the electrical resistance of carbon black the amount should be determined prior to evaluating the product for specific test and compounding.

One of the most important properties of a carbon black that affects its electrical resistance is the occluded gases which are present. The amount and actual percentage of the constituents of these occluded gases play a definite role in evaluating this specific property. Carbon blacks manufactured under different plant conditions and containing different amounts of occluded gases will present a difference in their electrical resistance. Therefore, to obtain a true evaluation of the resistance property of a carbon black the product should be devolatilized prior to testing. This would indicate more definitely what this value would be when compounded in a rubber insulation stock or other types of recipes in which the property of electrical resistivity is an important factor.

Relative particle size also is indicative of the extent of electrical resistance. The results show that the more finely divided the carbon black the greater the electrical resistivity. The electrical resistance decreases approximately in relative proportions as the relative particle size is increased from series to series. The determination of color intensity can be more or less correlated with the effect of relative particle size on the electrical properties of carbon black after the material has been devolatilized. Therefore, relative particle size as determined by color analysis can be set up as a possible criterion for indicating the apparent value of a black from the standpoint of its electrical resistivity.

In measuring the effect of aggregate particle size of carbon black on its electrical resistance very little information can be obtained as to its true value, due to the many variables which are present and which must be taken into consideration in order to determine this specific property.

Summary of Results

The chemical and physical properties of carbon blacks produced by the channel process evidence an effect on their electrical resistivity. To obtain a true value of electrical resistance of a carbon black, moisture and occluded gases must be taken into consideration and tests should be made on devolatilized material using standard pressure. The electrical resistance of a carbon black can be classified as a function of its relative particle size. Definite evaluation of channel type black, as to its electrical resistance, cannnot be determined from different size aggregates.

1939 Rubber Red Book ADDENDA and ERRATA

Page

52 Oroxo Grinding Wheel Company. Delete. Out of business. Also delete under "Mechanical Goods—Miscellaneous" on page 96; and under "Michigan—Detroit," on page 116.

204 Brockton Mould Company. Change address to 102 Matfield Street, East Bridgewater, Mass.

278 A. E. Starkie Company. Correct address is 528 North Cuyler Avenue, Oak Park, Illinois. Disregard previous change of address notice.

Modern Antiseptics for the Rubber Industry

Although the Application of Antiseptics in Rubber Products Dates Back as Far as 1870, Its Practical Application is Relatively New

By Robert A. Engel

Manager, Industrial Division, Givaudan-Delawanna, Inc.

THERE is a very decided trend in this country to make consumer goods sanitary or antiseptic. Perhaps advertising has played a part in this consciousness of the American public for sanitary products, but if so, it is probably true only in that the appeal was made to a truly American trait—cleanliness.

No country in the world even approaches the United States in respect to the number of bath tubs per capita, or as to the percentage of buildings and homes having running water. The famous "Chic Sales" structures, of course, do still exist in our rural sections, but they are rapidly being replaced as running water is installed on the farms . . . as a modernization program, along with automobiles, tractors and electricity. This condition does not exist to the same extent in other countries. We are proud of our cleanliness and any advertising appeal based upon it strikes a responsive chord in our emotional and physical make-up.

The cleanliness appeal has revolutionized the packaging of retail goods. The days of the sugar and flour barrels in the grocery stores are gone forever. The advent of cellophane and similar materials to wrap tooth brushes, shirts, underwear, candies, and all manner of food products gives evidence proving that the consumer likes cleanliness in the presentation of the merchandise he is buying.

The sequence to cleanliness—sanitation and antisepsis—is the logical development of the same idea. We are given bandages, medical supplies and even foods that were sterilized before leaving the factory, and which are presumably still sterile if the packing seal has not been broken.

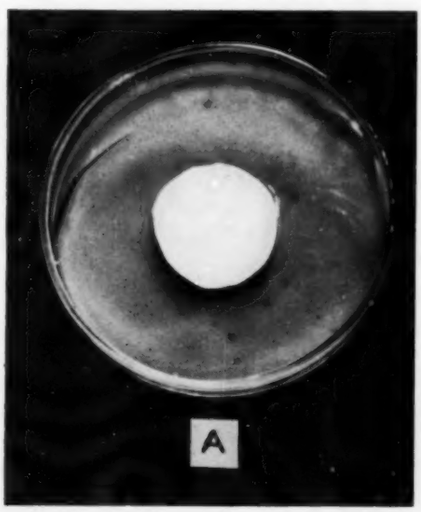
Now we find services and goods being offered definitely as antiseptic. Perhaps to some the difference between sterilized and antiseptic is not clear, so we shall define these terms. When the physician places instruments or rubber gloves, wrapped in muslin, in the steam sterilizer, the articles are subjected to a steam pressure of 15 lbs. (250°F) for fifteen minutes. This treatment kills *all* microorganisms and the instruments are, therefore, sterile and remain so if protected by the wrappings. As soon as they are removed from their wrappings, touched and used, they are no longer sterile.

We see that the definition of sterility, meaning the absence of every form of life, is quite simple. Around the word "antiseptic" much confusion has arisen in the past. It is derived from two Greek words—anti: against and septikas: rotten. This derivation suggests that the word should mean an agent to combat infection. In fact, that is what it does mean but so many other words have grown up in connection with the fight on disease germs that distinctions are being made which today are generally recognized.

A germicide or bactericide is an agent that will destroy germs or bacteria;

A disinfectant is a germicide designed for killing germs on inanimate surfaces;

An antiseptic is a germicide designed to kill germs on living animal surfaces and therefore supposed to



Results of agar plate tests with rubber samples. The test organism used was Staphylococcus Aureus. Sample A, on the left, contained no antiseptic and therefore shows no zone of inhibition. Sample B, in which was incorporated 1% Compound G-11, shows an excellent zone of inhibition, proving its antiseptic action.

be harmless, under prescribed conditions, to the human or animal body;

A substance is bacteriostatic if it inhibits the growth of bacteria without necessarily killing them.

For purposes of comparing the germicidal efficiency of phenolic disinfectants, phenol has been adopted as the standard; a disinfectant having a germicidal action five times that of carbolic acid (phenol) under certain prescribed conditions is said to have a phenol coefficient of 5.

In the case of antiseptics the phenol coefficient procedure is not applicable; the government has laid down certain special rules regarding the measurement of their effectiveness, differentiating between those which are allowed to remain in contact with the human body for only a very short time (such as mouth washes) and those which are left in prolonged contact with the body (such as antiseptic ointments, wet dressings, etc.) Since the antiseptic in the first case is required to accomplish its task in a very short time, the government requirements governing such antiseptics are far more severe than those intended for prolonged-contact antiseptics.

The Food and Drug Administration specifies that the pus-forming organism *Staphylococcus aureus* is to be used as the test organism to determine antiseptic action. The agar plate method, as described in Circular 198 of the U. S. Department of Agriculture, is applied for such tests. Antiseptic rubber goods would fall under this category and the accompanying pictures illustrate the inhibitory properties of the rubber materials containing Givaudan's antiseptic compounds.

On the other hand, mouthwashes, toothpastes, gargles and similar preparations are in contact with the body for only short periods, and here the F.D.A. and the Federal Trade Commission will allow the term "antiseptic" only if these products kill bacteria in the dilutions recommended and in a period of time comparable to that of the actual case.

Apparently, the rubber industry is rapidly becoming "germ or antiseptic conscious" for already antiseptic dress shields, toys and baby pants have been marketed and they click with Mrs. American Consumer.

The subject is relatively new as far as the practical application of antiseptics in rubber is concerned. Actually, the idea of making rubber antiseptic dates back as far as 1870 when one John Murphy of New York City, a manufacturer of rubber goods, was granted U. S. Patent No. 99,935 wherein he definitely set forth the idea of making rubber antiseptic through the use "of carbolic acid or the closely allied compounds cresol, rosol, etc., known as cresylic acid, rosolic acid, etc."

We quote further, "the application of phenol and the other compounds above mentioned, to elastic fabrics—preserves them and makes them incapable of carrying any contagious disease." In modern parlance, we would call this making the rubber antiseptic. It would seem to us that Murphy did anticipate the use of phenols as antiseptics for rubber and that, therefore, his patent was basic.

The progress made in organic chemistry since 1870 is obviously tremendous, with the result that more efficient products are now available for this purpose. The Givaudan Laboratories investigated this field of rubber antiseptics very thoroughly and developed several new compounds that appear ideal for the purpose. One of the prerequisites for a rubber antiseptic which we looked for in our research was that it be free from irritation and free from a pungent odor that would make the prospective purchaser unwilling to buy the rubber article. It is evident that in rubber, or rubberized wearing apparel such as girdles or dress shields, or in hospital sheeting, this would be particularly true.

Results of the Givaudan investigation were especially successful for not only were those odorless substances developed, but they possessed the equally important features of being very powerful bactericides. They are from three to six times as strong as thymol for example, and no more toxic than thymol in relation to their germicidal properties. Thymol is not considered a toxic drug as it is used extensively in pharmaceutical preparations, including mouth washes.

Two compounds are available for rendering rubber antiseptic. Compounds G-4 and G-11 are diphenyl methane derivatives. Patents have been applied for covering these compounds. The physical constants are:

	G-4	G-11
M. P.	174° C	161° C
Solubilities	alcohols, oils (1), fatty acids	alcohols, esters, ketones
Appearance	white crystals	white crystals
Odor	medicinal	none (2)

(1) with slight heating
(2) in pure form, slight phenolic odor in technical grades.

Compounds G-4 and G-11 are non-volatile products. G-11 has given the best results in rubber, generally 0.5% by weight of the rubber being sufficient to produce a definite clear zone of inhibition against *Staphylococcus aureus.*

The relative minimum lethal dose of these various compounds was established by a reliable pathological laboratory by means of feeding suspensions of the compound in orange juice to guinea pigs with the following results:

Product	*Minimum Lethal Dose*	*Phenol Coefficient against Staph. Aureus at 20° C.*
Thymol	1.25 grs./kg. wgt.	28
Compound G- 4	1.00 " "	90
Compound G-11	.30 " "	185

The thymol was dissolved in 20% alcohol. The value for thymol checks with the figure obtained by other investigators.

Compound G-11 in the form of its sodium salt is six times as powerful a bactericide as thymol, having a phenol coefficient of 185 against *Staphylococcus aureus* at 20°C., compared to 28 for thymol on the same basis. An interpretation of these figures is interesting; a human being with suicidal intentions, weighing 60 kg. (132 lbs.) would require taking internally at least 18 grams, or about ⅔ of one ounce of undiluted substance G-11, in a single dose to achieve death. Therefore, the use of these compounds in rubber goods is safe.

There are many interesting possible applications in the rubber industry for the antiseptic materials. The obvious uses as in rubber and rubberized garments have already been mentioned. For hospital sheeting, surgical tubing, rubber gloves, hot water bottles, nipples, adhesive plasters, drain mats and sponges, their use is particularly indicated.

The possibilities of using Compound G-4 which has

(Continued on Page 171)

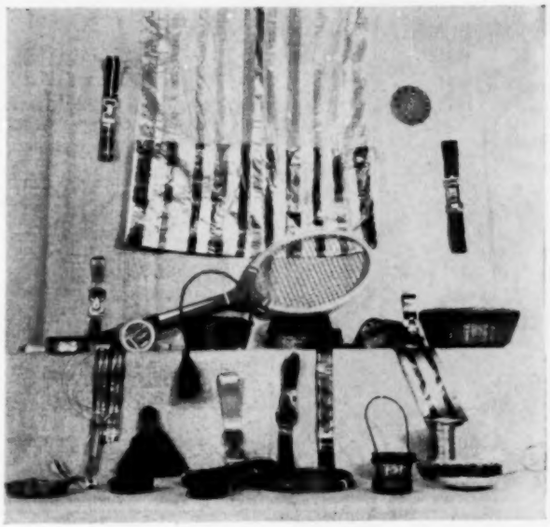
TENSOLITE–
"Tensilized" Rubber Hydrochloride

New Material, Produced from Pliofilm, Is Believed to Have a Myriad of Applications Not Possible with Rubber

THE history of research includes many instances where the search for one product indirectly led to the discovery and development of a totally foreign product, one far afield from the original purpose of the research, but nevertheless of importance to general industry. Bakelite is one excellent example. Neoprene is another. The stories behind these discoveries are too well known to bear repetition. The discovery of Tensolite—"tensilized" rubber hydrochloride—however has never been recorded in the technical press to our knowledge.

Tensolite, which might be called "tensilized Pliofilm," is the development of Henry D. Minich, consulting engineer of Philipse-Manor-on-Hudson, New York. While with the prominent drug firm of Johnson & Johnson, New Brunswick, New Jersey, Mr. Minich began a series of experiments designed to produce a synthetic bristle which could be used on tooth brushes to replace the imported bristles which then constituted the only source of supply.

Learning of Pliofilm, Goodyear's rubber hydrochloride material, in 1934, shortly after it was introduced commercially, Mr. Minich became convinced that its characteristics lent themselves to the production of synthetic bristles. He resigned from Johnson & Johnson in 1935 and spent the entire summer of that year carrying on intensive investigations. He found that he could produce a bristle from Pliofilm by one method but also discovered a method which enabled him to make dental floss and dental tape from the same material.



A few of the numerous products which can be made with Tensolite, including belts, baskets, thread, ribbon, etc.

Rugs, runners, bags, ties, tapestries, and trimmings for hats are other products which can be made with Tensolite.

As Mr. Minich puts it: "I found that I had developed extraordinary strength in a material that was relatively weak and therefore my work ran to other kinds of tapes. A combination of colored Pliofilm suggested decorative package ties (now Plioribbon) and many other decorative uses where resistance to oil, grease, water, alcohol, etc., was important. This was further emphasized by finding that the processed Pliofilm would literally run away from a flame and was therefore free from fire hazard even though the material was itself destroyed by its shrivelling action. It was the only common material I knew of (or still know of) that shrinks with heat rather than expands."

What Mr. Minich actually discovered was that when heat, pressure and tension, in the proper amounts and degrees, was applied to Pliofilm, a change in the molecular structure took place, resulting in a material with greatly improved tensile strength. He calls the proper application of these elements the "tensilizing" process, calling the finished material Tensolite to denote its increased tensile strength.

He further learned that the application of the process to normal Pliofilm produced a material as thin as .0002 commercially and one of .00008 in the laboratory, and that he could build up the thickness to ¼-inch or more if desired. He also discovered that if various colors were incorporated during the "tensilizing"

The above reproduction gives some idea of the myriad of products which can be made with the new "tensilized" rubber hydrochloride.

process, beautiful and practical effects were obtained as compared with the solid, plain colors used theretofore.

A further illustration of the "tensilizing" process is seen in the operation of the "Stretch-Wrap" machine developed by the Stokes & Smith Co., Philadelphia. Sheets of Pliofilm fed into this machine are stretched under heat and then cooled while in the stretched position. The tensile properties of course regulate the amount of stretchability.

Mr. Minich also found that he could develop new surface textures and totally new forms, such as round thread and cord, tapes, lacings, tubes, beaded edge ribbon, tapered bristles, endless belts, and many other things. While the exceedingly thin material made rubber "go much further" the heavier laminated material opened up new avenues. To secure most of these products Mr. Minich designed and built many machines, "one after the other for improved technique," as he puts it.

The "tensilization" of rubber hydrochloride seems to offer endless potentialities where neither rubber nor rubber hydrochloride could be used before the process was developed. The ultra thin single ply material, for instance, lends itself to packaging decoration and display, to various sanitary goods, hospital sheeting, fruit wraps, stage effects, sheeting for floral use, and others.

The laminated material, due to its range of thickness, color, surface texture, strength and toughness, as well as to its resistance to water, oils, alkalis, alcohol, etc., may be used for a greater variety of purposes such as: adhesive tape, artificial flowers, bags, bag linings, bathing caps, belts, book covers, costumes, envelope linings, package ties, raincoats, ribbons, shower curtains, sweat bands, table covers, ticker tape, tobacco pouches, wall coverings and wind breakers.

Threads and cords made from "tensilized" rubber hydrochloride are divided by Mr. Minich into three separate categories:

(a) Fine filaments for stockings, hairnets, braided fishing lines, filter cloth, weaving applications, tassels;

(b) Threads for sewing, weaving, sutures, dental floss, decorative windings for sporting goods, braiding and a special form, called Pliolastic, for shirring and elastic cloth and braids;

(c) Cord for musical strings, tennis strings, nets, cables, shock cords, macrame material, basketry material, chair seats, leashes, lacings and flexible tubes. The material for tennis and badminton strings Mr. Minich calls "Guttarubba." He gives the name "Florafilm" to that used for making artificial flowers, including the stamens.

Yarns made of Tensolite, according to the inventor, may be made in numerous variations, such as crushed, twisted, rolled, multi-color, etc., which may be used for weaving mats, runners, upholstery, lamp shades, and rugs; for braiding belts, berets, hats, shoes, bags, ties, suspenders, garters and decorative cords; for crocheting bags, sweaters, snoods, etc. Some excellent weaving is said to have been done with the material by the famous St. Mary's Weavers.

Shaped articles, too, can be made of "tensilized"

rubber hydrochloride, including inflated items, gloves, finger cots, bottle caps and covers, artificial flowers, pot covers, etc. The "stretch-wrap" process, using the machine specially designed for the purpose by Stokes & Smith, is said to enlarge this field, particularly when several plies are to be used to give desired strength, especially in the packaging of irregularly shaped articles or where complete exclusion or confining is desired for moisture, odor, flavor, or other element.

Other uses for Tensolite include the production of endless belts, particularly for light mechanical drives. The belts may be shrunk with heat to exact sizes and tension. Bristles in a wide range of thickness and stiffness, and of course, color, can be used for toilet brushes of various kinds, including tooth brushes. For buffing purposes, bristles may be made with or without an abrasive. Buffing brushes so made can be used to buff metals in acid and will withstand the action of other deteriorating materials.

Materials Find Unique Applications

As peculiar as it may seem, most of the products described above—from the cocoon silk size, or fine filaments, to the endless belts—can be made on the same machine with different attachments and changes in the processing technique, according to Mr. Minich. The products mentioned are only a small part of the number which can be produced. Many of the materials, due to their unique characteristics, find unique applications. The basketry material, for example, while too expensive for common use, has found a definite place in occupational therapy in hospitals and institutions, where reed cannot be used because of the nuisance of soaking. The brilliant colors of Tensolite have been found to prove particularly pleasing to the invalid, and the material is easy for him to work with.

The variations in each of the many products, which depend upon the particular use to which the material is to be put, are almost as numerous as the number of products. For instance, the laminated materials may be made with or without grain, tear resistant, cross laminated, low drawn, net-filled, striped, printed, mottled, smooth, embossed, ribbed, beaded, ruffled, threaded, perforated, etc. The threads and cords, as another example, may be level, tapered, tubular, elastic, inelastic, filled (using cotton, wool, sisal, silk, rayon, linen, rubber or wire), round, oval, square, oblong, smooth, rough, etc.

Several Patents Cover Processes

Several patents have been issued to Mr. Minich covering various formulations and processes. As he states: "The matter is tied in closely with Goodyear of course because no one else is producing the material which I use. I therefore have relatively little that can be licensed in the broad sense. There are, however, many things I can supply under my arrangements and I can probably be of considerable assistance in more ways than one."

Goodyear, according to R. P. Dinsmore, Assistant Manager of the Development Department of that company, has acquired Mr. Minnich's rights. Notable among the "tensilized" Pliofilm products made by Goodyear are certain grades of packaging materials, as well as vari-colored stripings for shower curtains, raincoats, costuming materials, etc. Plioribbon, a form of converted Tensolite, or "tensilized" Pliofilm, is produced by Freydberg Bros. of Stamford, Conn. Tensolite-coated gold and silver cloth is also said to be used extensively where a non-tarnishable, inexpensive material for bags, belts, evening slippers, etc., is desirable.

Latex-Wrapped Apples

FOR many years horticulturists have been attempting to perfect an artificial covering for fruit that will lessen storage and market shrinkage and which at the same time will increase the attractiveness of the fruit at the point of sale. These attempts were increased recently when it was discovered that new washing treatments introduced in the fruit industry tended to remove the natural wax protection of fruits, particularly apples. One interesting result of these experiments, described in a recent issue of the *American Fruit Grower*, is a development of the Fruit Machines Company of Portland, Oregon, which embraces the use of a latex covering on apples. The process has aptly been termed "Rapal."

In the "Rapal" process, the apples are immersed in latex and a hardener. A label, made of yellow fabric tape, is then placed on the apple over the coating. To remove the latex covering the consumer grasps the label and as the label peels off the covering comes with it. Tests are said to have conclusively proved that these apples reach the consumer in a clean, sound, ready-to-eat condition. The latex is not messy to handle, peeling off the apple without breaking.

One drawback to many protective coatings previously introduced has been their lack of proper porosity with subsequent stoppage of normal fruit respiration which causes physical decay. To prevent this breakdown, the latex and hardener in the "Rapal" process are applied in such manner that the fruit is able to give off harmful gases resulting from respiration. As yet, the process has been used for apples prepared for special market outlets only, but its use is expected to spread to other fruits in the near future.

Tygon Lining Materials

ONE of the latest so-called synthetic rubbers or rubber-like materials to make its appearance is a modified halide polymer known as "Tygon", developed by the U. S. Stoneware Co., Akron, Ohio. Unlike natural rubber, which it is said to resemble in many physical properties, Tygon is unaffected by active oxidizing agents and many of the hydrocarbons. It is completely immune to hydrofluoric acid and in addition to handling oxidizing agents and hydrocarbons which adversely affect natural rubber it is practically unaffected by all the reagents which rubber resists satisfactorily. Tygon linings, in most cases, may be used at temperatures up to 200° F. For services above this temperature special precautions must be taken.

A form of Tygon is also available for the production of molded or extruded articles which must resist the attack of corrosive agents. All of the compounds in this form of the material are definitely thermoplastic and exhibit elasticity to some degree. Grades used in molded or extruded goods are so compounded that their thermoplastic tendency is not objectionable over their normal usable temperature range. Between 25° and 150° F. the extensibility of Tygon compounds is somewhat less than that of an average natural rubber compound but its percent recovery after extension, while slower than rubber, is said to be more complete.

As yet no method of blending Tygon with crude rubber has been discovered. The molding of Tygon is entirely a heat-shaping process and does not involve vulcanization or polymerization.

Copies of the 1939 RUBBER RED BOOK are still available at a cost of $4.00 for paper-bound and $5.00 for cloth-bound editions.

General-Collins Emergency Lung

BACK in 1937, aroused by the plight of Fred Snite, Jr., the paralysis victim whose case has been a matter of public interest for a number of years, engineers and designers of the General Tire & Rubber Company of Akron, Ohio, began to experiment with the possibility of producing a "rubber lung" to replace the heavy, awkward "iron lung" which is used to enable paralysis victims to breathe after the muscles of the

chest and abdomen virtually cease to function. At that time a device was developed which proved to be an improvement over the "iron lung." (See the December, 1937, issue of THE RUBBER AGE).

General Tire engineers have continued their development work in the past two years and the company has now announced an improved "lung" which has been given the name of the General-Collins Emergency Lung. The new lung not only provides the patient with a regular, rhythmical supply of air, as the conventional "iron lung" does, but provides additional aid because of its lightness, simplicity and portability. Whereas the "iron lung" entirely encases the patient's arms and legs, thus making treatment of such parts difficult, the General-Collins lung covers only the patient's chest, leaving the arms and legs free for nursing care.

The new lung is constructed from a transparent material which makes it possible for doctors and nurses to observe the action of the patient's chest walls through the lung while it is in place. Even when clothing is being worn the new lung can be sealed perfectly to the patient's body, according to General Tire engineers. A perfect seal is said to be insured by use of a pneumatic rubber ring, in conjunction with a sponge rubber flap, which adheres closely to the body. A backstrap holds the lung in position and allows the patient to sit up in bed or even in a chair while it is in position.

Air is supplied to the General-Collins lung through an ordinary vacuum hose by an electric pump operated by a ¼ h.p. motor having a rubber bellows, 15 inches in diameter, which operates at a speed of from 16 to 17 pulsations per minute, effecting a variation in suction from 5 to 30 cm. of water. This speed can be changed as necessary. Air is exhausted from the lung, thereby expanding the chest and effecting rhythmic respiration at from 16 to 17 cycles per minute. Attached to the air hose, between the lung and the pump, is a centimeter gauge and bleeder valve, in order to permit accurate control of the desired range of vacuum to suit the comfort of the patient.

Compared to the conventional "iron lung", the new rubber-covered lung is said to be quite reasonable in cost, thereby making it accessible to even the smallest hospitals. It can be carried easily in an ambulance for artificial respiration in drowning cases, attempted suicides, and similar emergencies. Where electric power is not available, or if current should fail, the pump which operates the lung is provided with a manual operating lever which permits the lung to be operated by hand if necessary. Warren E. Collins, of Boston, Mass., who has been producing "iron lungs" for many years, will distribute the General-Collins Emergency Lung.

Pluralastic Shugor

FOR approximately the past eighty years all rubber thread used in elastic webbing was either cut from rubber sheet or extruded in a single one-piece thread. These threads were then combined with textile fibres which held them firmly in place, the highest development of this art being used in the production of shoe goring. The major difficulty of the one-piece elastic yarn lay in the fact that when the stitching needle in the shoe factory struck it the thread was punctured, regardless of whether the thread was flat or round, and subsequent flexing of the goring in the shoe resulted in an increased puncture until the thread generally broke, ruining the value and the appearance of the webbing.

A new goring, known as Pluralastic Shugor, marketed by Thomas Taylor & Sons, Inc., Hudson, Mass., is said to eliminate this problem from the shoe manufacturing field. Pluralastic consists of two or more strands of rubber bonded together so that each strand stays in fixed relation to each other, forming a naked rubber thread. This bonded rubber thread is covered with yarn in the same manner as ordinary thread to form a covered rubber. The yarn, however, is so tightly wound about the Pluralastic core that the core is compressed into a round form instead of retaining its original square cross-sectional shape.

Unlike other varieties of rubber thread, according to Taylor, Pluralastic when woven into webbing eliminates the danger of needle cutting by sewing machine

needles. Should the needle nick one strand, the other strand (or strands) remains intact and keeps the strands from "poking" through the surface or running back. In other words, despite the puncturing of any single strand the effective strength of the rubber thread is unimpaired and the appearance of the goring is unaffected. The Taylor concern has the sole right to the use of Pluralastic in shoe goring.

Digest of the Fair Labor Standards Act

A Guide to Employers' Responsibilities Under the Act Together with Valuable Suggestions for Record Keeping

THE Fair Labor Standards Act of 1938, enacted by Congress to prevent the use of the channels of interstate commerce to spread and perpetuate labor conditions detrimental to the health, efficiency and well-being of workers, and to wipe out unfair methods of competition based on such conditions, applies to every rubber manufacturer in the United States. This digest of the terms of the Act, prepared by the U. S. Department of Labor, contains those provisions which apply specifically to rubber and other manufacturers, and lays particular stress on the calculation of overtime pay and to the record keeping requirements. The suggestions given should prove of particular value to the small and medium size rubber manufacturer.

Coverage

The wage and hour provisions of the Fair Labor Standards Act of 1938 apply to each employee engaged in:

(a) Interstate trade, transportation or communication.

(b) Handling, mining, transporting, in any manner working on, or in any occupation necessary to the production of, goods which move in interstate commerce.

An employee is covered by the Act if even a small percentage of the goods he works on is moved in interstate commerce.

Employees within the District of Columbia and the Territories and possessions are dealt with on the same basis as employees working in any of the 48 states.

Employees are engaged in the production of goods for interstate commerce where the employer, at the time of production, has reason to believe the goods will be moved in interstate commerce, or will become a part or ingredient of goods (such as buttons on shirts) which will be moved in interstate commerce.

The child labor provisions of the Act apply to establishments in the United States, Alaska, Puerto Rico, and Hawaii whose goods are shipped or delivered for shipment in interstate commerce.

Wages

The minimum wage rate required by the Act is: 30 cents an hour for the 6 years from October 24, 1939, to October 24, 1945 (it was 25 cents an hour from October 24, 1938 to October 24, 1939), and 40 cents an hour thereafter.

The Administrator of the Act may, by order based upon the recommendation of an industry committee, establish for any industry a minimum wage between 30 and 40 cents an hour. These higher rates will be given publicity reasonably calculated to notify the industry, but employers themselves should make sure whether or not a wage order has been issued applying to their industries.

The Act does not require that employees must be paid on an hourly basis. Any method of payment (such as piece rates) may be used provided it satisfies the wage requirements of the Act.

In computing wages for the purposes of the Act, the employer may include the reasonable cost of furnishing his employees with board, lodging, or other facilities if they are customarily so supplied. "Reasonable cost" does not include a profit to the employer or to any affiliated person. The cost of furnishing facilities which are primarily intended for the benefit or convenience of the employer (such as tools of the trade) may not be included in computing wages.

Hours

The maximum standard workweek provided by the Act is: 42 hours per work-week from October 24, 1939, to October 24, 1940 (it was 44 hours from October 24, 1938, to October 24, 1939), and 40 hours per workweek thereafter. These are not limitations upon the number of hours an employee may work. The Act merely requires that work above these weekly limits shall be paid for at the rate of at least one and one-half times the *employee's regular hourly rate of pay.*

A workweek is seven consecutive 24-hour days. It may begin at any time of day, but no changes in the workweek may be made for the purpose of evading the overtime provisions of the Act. There is no limitation on the number of hours that may be worked in any one day.

There may be no "averaging" over two or more workweeks. Time lost for any reason (sickness, etc.) during one workweek may not be made up in any succeeding workweek without payment at overtime rates for all hours worked in the succeeding week over the statutory maximum.

Compensation for overtime must be paid in cash and at the time when the employee customarily receives his compensation. It must be at the rate of *not less* than one and one-half times the employee's *regular* hourly rate of pay.

Records

Employers covered by any provisions of the Act must keep records, though no definite form is required. The only specific requirements are the following:

(a) Records must be kept either at the place of employment or at an office of the employer located in the same state, unless otherwise authorized by the Administrator.

(b) They must be kept for *at least 4 years* and be open for inspection and transcription by representatives of the Wage and Hour Division.

(c) They must be in such condition that an inspector can easily obtain the information which must be maintained under the terms of the Act.

With regard to each employee, except those exempt-

Workweek ending ..... **Date of payment (f)**.....

Name *In full* (a)	Social Security Account No.	Hours Worked								Regular Rate of Pay (g)	Wages					
											Earnings			Deductions		Total wages paid (e)
		S (d)	M (d)	T (d)	W (d)	T (d)	F (d)	S (d)	Total (d)		At regular rate of pay for total hours worked (h)	Extra for overtime (i)	Total earnings	Federal old-age insurance taxes	Other (itemized)	
1. George Henry Harper..	129-99-4231	----	8	8	8	8	8	8	48	62 cents per hour (60 cents per hour plus bonus).....	$29.76	$1.86	$31.62	$0.32	.....	$31.30
2. Martha Jane Wilson...	154-99-2176	----	8	8	8	8	8	5	45	50 cents per hour ($21 per week of 42 hours).....	22.50	.75	23.25	.23	.....	23.02
3. Henry Miller Hawkins..	356-99-4578	----	8	8	8	8	8	7	47	44 cents per hour ($80 per month on a week of 42 hours).	20.68	1.10	21.78	.22	.....	21.56
4. Beatrice Mary Foster..	369-99-7241	----	8	8	10	8	8	8	50	30 cents per hour ($15 per week).....	15.00	1.20	16.20	.16	.....	16.04
5. Janet Barber.....	270-99-1107	----	8	8	8	8	8	6	46	31 cents per hour (P. W., plus bonus).	14.26	.62	14.88	.15	.....	14.73

Although no particular form is required under the terms of the Act, the above sample pay-roll form has been found simple to maintain.

ed from the Act, employers must keep the following information:

(a) Name in full.
(b) Home address.
(c) Date of birth if under 19.
(d) Hours worked *each workday and each workweek*.
(e) Total wages paid each workweek.
(f) Date of payment.

In addition to the above, when hours over the statutory maximum are worked by the employee, the following information must be maintained:

(g) Regular hourly rate of pay and basis upon which wages are paid.
(h) Earnings at regular hourly rate of pay for each workweek.
(i) *Extra* earnings for overtime.

Where the actual cash wage paid is less than the minimum wage required by the Act and the employer is relying upon the furnishing of board, lodging, and other facilities to bring the wage up to the minimum, the records should show the cash wages actually paid and the amount claimed for board, lodging, and other facilities, which can in no case be greater than the cost.

There can be no substitute for an accurate *daily* record of the number of hours *actually worked* by each employee. The posting of a notice specifying the regular hours of work and forbidding overtime "without express official authority" does not release an employer from the obligation to keep a record of hours actually worked.

Waiting time constitutes time worked and must be recorded as such, whenever an employee is required to be on duty, on the employer's premises, or at a prescribed workplace, or when the time is too short for the employee to spend it for his own purposes.

Hourly Rates of Pay

The regular hourly rate of pay is the agreed hourly rate plus production bonuses earned that week (if any) averaged over the number of hours worked that week. Illustration:

(1) *George Henry Harper* (see sample pay roll form) is paid 60 cents an hour plus a production bonus of 96 cents for the week. For 48 hours' work he earned $29.76 ($60 \times 48 + 96$), exclusive of additional compensation for overtime, which gives him an average hourly rate of 62 cents ($29.76 \div 48$). If he had not been paid a production bonus, his regular rate of pay would have been 60 cents.

Weekly or Monthly Wage for Regular Number of Hours

The regular hourly rate of pay is the weekly wage, or the monthly wage reduced to a weekly wage, averaged over the regular number of hours per week fixed by agreement or custom. Production bonuses earned any week should be included in that week's wage. Illustrations:

(2) *Martha Jane Wilson* is paid $21.00 per week for a week set at 42 hours by agreement or custom. Therefore, her regular hourly rate of pay is $21.00 divided by 42, or 50 cents an hour.

(3) *Henry Miller Hawkins* is paid $80.00 per month. His workweek is 42 hours, set by agreement or custom. Therefore, his regular hourly rate of pay is 12 times $80.00 divided by 52 divided by 42, or 44 cents an hour. (In other words dividing his annual wage by 52 weeks, and dividing that sum by 42 hours worked per week).

Weekly or Monthly Wage with No Regular Number of Hours

Where there is no regular number of hours per week fixed by agreement or custom, the regular hourly rate is the weekly wage, or the monthly wage reduced to a weekly wage, divided by the total number of hours actually worked in the week. Illustration:

(4) *Beatrice Mary Foster's* regular rate of pay is $15.00 a week, but her weekly number of hours is not set by agreement or custom. One week she works 37 hours; the next 52; etc. Therefore, her regular hourly rate of pay changes weekly. In the week under consideration she worked 50 hours. Her regular hourly rate in that week was $15.00 divided by 50, or 30 cents.

Piece Work

The regular hourly rate of pay is the piece-work earnings (including production bonuses, if any) divded by the total hours worked each week. Note:

(5) *Janet Barber* is a piece worker who is paid a piece rate plus a production bonus. In the week under consideration she worked 46 hours and earned a wage of $14.26, including the production bonus. Therefore, her regular hourly rate of pay was $14.26 divided by 46, or 31 cents an hour.

Miscellaneous

The regular hourly rate of pay need not include any figure for extra compensation attributable to overtime rates.

Earnings at regular hourly rate does not include *extra* compensation for overtime. See column *h* of the sample pay-roll form.

Extra earnings for overtime is the *extra* pay for overtime *over and above* pay for overtime at the regular rate.

An employer must also keep records, giving only name in full, home address, and occupation, for each employee exempt from the wage and hour provisions of the Act.

Special records must be kept for employees engaged in industrial homework. (A copy of these regulations may be obtained from the Wage and Hour Division of the U. S. Department of Labor, Washington, D. C.).

The signature of a worker on a time or pay-roll record will not relieve the employer from responsibility if the record is inaccurate.

Penalties

Employees may bring suits themselves or through an agent in any court of competent jurisdiction to recover unpaid minimum wages or unpaid overtime compensation. Employers violating the wage and hour requirements are liable for double the unpaid sums plus court costs and reasonable attorney's fee.

The Federal Government may prosecute criminally for violations of the Act, including the discharge of, or discrimination against, any employee who has filed a complaint. Upon conviction the employer may be fined up to $10,000 or, in the case of a second conviction, imprisoned up to 6 months. The Administrator and the Chief of the Children's Bureau may also ask a Federal District Court to restrain violations of the Act by injunction.

It is unlawful not only to produce goods for interstate commerce in violation of the Act *but also to ship, deliver, or sell in interstate commerce goods so produced.* This is the "hot goods" provision. Any person found with such "hot goods" in his possession, even though he is not the original producer, may be restrained by injunction from shipping these goods in interstate commerce. He may also be subject to the criminal penalties of the Act if he ships them knowing or having reason to believe that they were produced in violation of the wage and hour provisions of the Act.

No provision of the Act shall justify an employer in reducing the wage or increasing the hours of work of any of his employees.

Child Labor

The child labor provisions of the Act prohibit the shipment or delivery for shipment in interstate commerce of any goods produced in establishments in or about which "oppressive child labor" has been employed within 30 days prior to removal of the goods. "Oppressive child labor" is defined as:

(a) Employment of children under 16, except employment of children between 14 and 16 years of age in such non-mining and non-manufacturing occupations as the Chief of the Children's Bureau determines not to interfere with their schooling, health, or well-being.

(b) Employment of children between 16 and 18 years of age, in occupations found, and by order declared, by the Chief of the Children's Bureau to be particularly hazardous or detrimental to their health or well-being.

Employers can protect themselves from unintentionally employing a child under the legal age by having on file a Certificate of Age issued in accordance with regulations of the Children's Bureau showing that the child is above the legal age for employment in the occupation in which he is engaged.

Exemptions

Although workers in a number of industries and occupations are exempt from either the wage or hour provisions of the Act only the following exemptions apply under the provisions in the rubber industry:

Employees engaged in a bona fide executive, administrative, professional, or local retailing capacity, or in the capacity of outside salesmen, are exempt from both the wage and hour provisions of the Act, as well as employees engaged in any retail or service establishment, the greater part of whose selling or servicing is in intrastate commerce.

Employees in industries found by the Administrator to be seasonal are partially exempt from the maximum hour provisions of the Act. They may work up to 12 hours a day or 56 hours a week without payment of overtime rates, for a period or periods not exceeding a total of 14 workweeks in any one year. (No attempt has been made by any branch of the rubber industry at this writing to our knowledge to secure a seasonal rating).

Employees working under an agreement, made as a result of collective bargaining by representatives of employees certified as bona fide by the National Labor Relations Board are also partially exempt from the maximum hour provisions of the Act. The agreement must provide for an absolute maximum of 1,000 hours' work in 26 weeks or 2,000 hours' work in 52 weeks. In the latter case, there must be a guarantee of a fixed annual wage or continuous employment for either 52 weeks or for 2,000 hours. In either case, work over 12 hours a day or 56 hours a week must be paid for at the rate of time and one-half.

Learners, Apprentices, Etc.

No learner, apprentice, messenger, or handicapped worker may be employed at less than the minimum wage except under special certificate issued by the Wage and Hour Division of the Department of Labor in accordance with regulations promulgated by the Administrator.

Modern Antiseptics for Rubber

(Continued from page 164)

already been found effective as an "athletes' foot" remedy in a 2% solution in aqueous alcohol, are especially interesting in connection with all types of shoe linings. This is already under investigation by some of the large shoe manufacturing concerns. We know the spores of the pathogenic fungi, causing athletes' foot, can be prevented from growing on a lining treated with a sufficient amount of Compound G-4. In rubber floor mats, such as used in locker rooms, this should be a particularly desirable feature.

The preparation of these various compounds to render them dispersible in latex is now under investigation, for many latex compounds will require the added antiseptic feature too. There is sufficient practical experience behind these compounds to show that they are stable in rubber compounds and possess no deleterious effects in the types of compounds in which they have been used, even in concentrations as high as 2% by weight of the rubber.

Givaudan is proud of its contributions to the field of antiseptics, ideally suited for the use of the rubber industry. It is now possible to obtain powerful non-toxic, non-irritating, odorless compounds to be added to rubber to render it truly antiseptic when tested by the approved Food and Drug Administration procedure.

New Equipment

Improved Verigraph Recorder

ALTHOUGH the first Verigraph Recorder introduced by the Foxboro Company, Foxboro, Mass., more than ten years ago did its work well, it provided opportunity for refinements in mechanical and electrical design. These refinements were carefully tabled through the years and have now been incorporated in an Improved Verigraph Recorder which features simplicity in design and exacting selection of materials which will not vary with temperature changes. The Verigraph Recorder, used for the continuous weighing of sheeted materials, consists of two units, the measuring head and the recorder. The measuring head is installed at the edge of the web of material, close after the point where the coating is applied, or, in the case of sheet rubber, immediately after the calendering operation. Each measuring head is connected with its own recorder by a special armored cable. One or two sets are installed, depending on the width of the material and other circumstances. Supported by two rollers, the web moves between two steel plates, separated by a precisely determined space. These plates constitute an electrical condenser, the capacity of which varies according to the weight of the material passing between them. The variation of capacity operates through the electrical measuring system to actuate an indicating target and recording pen. An index counter sets the electrical system so that the target is at zero when the material is at the specified standard weight. Motion of the target from zero shows the magnitude of weight variation. As a result of the operation described, any variation in the total weight of the material passing between the weighing plates is instantly transmitted to the recorder and there shown by highly multiplied movement of the white target, toward "high" or "low." Simultaneously, the pen records on its chart, which is scaled to be read in ounces per square yard, or other suitable units. Signal lights or other devices can also be arranged to give warning if variations in the material exceed the tolerance limits.

Welding Service for Banburys

A WELDING SERVICE especially for users of Banbury mixers is now being offered by the Interstate Welding Service of Akron, Ohio, and Chicago, Illinois. This company not only rebuilds single parts but also reconditions and rebuilds complete Banbury units. Many of the industry's leading rubber manufacturers are said to have already availed themselves of this much needed service. According to the company, the knowledge of the various abrasives that go into rubber compounds and other materials mixed in Banburys has aided it in developing and applying a harder metal that gives longer service.

Reactrol Control System

A NEW system for automatically regulating the power input to electrically heated equipment, such as furnaces, boilers, superheaters, and air heaters, has been announced by the General Electric Co., Schenectady, N. Y. Called the Reactrol Control System, this new means of control regulates power input by varying the voltage impressed on the heating resistors in accordance with temperature or pressure requirements. It is particularly suitable for continuous processes and in the treatment of materials that might be affected by slight changes in temperature.

Taylor Variable Speed Timer

A NEW precision set variable speed timer, known as Model 112R, designed for use on vulcanizers, tire presses and platen presses, has been introduced by the Taylor Instrument Companies, Rochester, N. Y. The new timer is said to make possible the exact overall timing of the cure and the exact sequence of the various steps and functions of the cure. Exact timing makes it possible to adjust the work load so that the individual operator works to the greatest efficiency. Seven standard gear ratios provide seven ranges of time adjustment on the new instrument, for each of which there are 80 different speeds of cam revolution. Adjusting the timer from one speed to another is easily and quickly done by hand. Closed

mercury switches are used to eliminate open contacts. These switches are connected to solenoid air pilot valves of the lock-in type so that in case of electrical failure during a cure the valve will not change position. Taylor's new timer is said to eliminate such unfavorable elements as air pistons, over-running clutches, friction drives and limit switches.

Booklets, Catalogs, etc.

Shell Carbon: Its Properties and Uses in the Rubber Industry. Shell Chemical Co., Shell Building, San Francisco, California. 6x9 in. 39 pp.

In addition to giving the specifications of Shell Carbon, formerly known in the rubber industry as Shell Carbon 53-B, this booklet gives data on the behavior of the material in processing, the properties of rubber compounds containing it, its use in rubber products, and its use in connection with the so-called synthetic rubbers, latex and reclaimed rubber. Several formulas including Shell Carbon, covering molded and extruded goods among others, are given, while brief references to test methods are made. A glossary of trade names mentioned throughout the booklet, giving the chemical composition of each, is also included. Shell Carbon is a soft carbon black made by subjecting a sulfur-free natural gas to sufficiently high temperature to cause splitting into pure carbon and hydrogen.

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A.S.T.M. Standards on Textile Materials. American Society for Testing Materials, 260 S. Broad St., Philadelphia, Penna. 6x9 in. 320 pp. $2.00.

All of the specifications, tolerances, tests and definitions developed by the A.S.T.M. through the work of Committee D-13 on Textile Materials are included in this 1939 textile compilation. In addition to standards covering identification and determination of cotton fibers, general tests on woven fabrics, asbestos roving, yarns and tape, and test methods on cotton, there are specifications and tests covering hose and belt ducks, cotton goods for rubber and pyroxylin coating, tire fabrics, tire cord and Holland cloth. A valuable part of the book is the abstracts of papers presented at meetings of Committee D-13.

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Hercules Chlorinated Rubber. Hercules Powder Co., Wilmington, Delaware. 4¼x7¼ in. 33 pp. Loose-leaf.

Rather than attempt to keep the old handbook on Hercules Chlorinated Rubber, formerly known as Tornesit, up-to-date, the company has published this entirely new loose-leaf book which will be added to as new information becomes available. The new handbook gives data on the properties of the material, in addition to its solubility and compatability with certain plasticizers and resins. Information on several chlorinated rubber finishes is given, as is some data on the use of chlorinated rubber in inks, adhesives and emulsions. A chart showing concentration-viscosity curves for several standard types of the company's chlorinated rubber is part of the handbook.

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Magnesium, Magnesite and Dolomite. By J. Lumsden. Published by Mineral Resources Department, Imperial Institute, London, S.W. 7, England. 6¼x9¾ in. 126 pp. 2s. 6d. (approximately 60 cents at the current rate of exchange).

Sources of supply, extraction, preparation and principal uses of magnesium, magnesite and dolomite are thoroughly discussed in this booklet. The physical and chemical properties of each material are given, as is world-wide production data. The production of each of the three materials by countries constitutes an important phase of the booklet. Although written from the British point of view, American manufacturers using the materials covered will find it of interest. Complete references to the technical literature are included.

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Goodrich Air-Cell Cushion. B. F. Goodrich Co., Akron, Ohio. 8½x11 in.

This attractive, well-illustrated folder depicts many of the special shapes into which Air-Cell can be molded, discusses its application, and stresses the special properties which make it suitable for use in many products. Air-Cell is the latex cushioning material made by Goodrich.

The Verigraph Recorder. (Bulletin No. 234.) Foxboro Co., Foxboro, Mass. 8½x11 in. 8 pp.

A method developed to meet the demand in the rubber and coated materials industry for precision control to insure uniformity of processing is described in this bulletin. A discussion of the principle of the Verigraph Recorder, which makes possible this method, explains its complete operation. Refinements made in the instrument are emphasized by a comparison with the first unit, built in 1926. Photographs depict installations in the tire and footwear fields, with operation data given in some cases.

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Acidseal Paints. B. F. Goodrich Co., Akron, Ohio. 8½x11 in. 4 pp.

The properties of Acidseal Paints (derived from rubber), directions for use, a discussion of each type stressing its special characteristics, and exact reproductions of the different colors in which the paints are made are all included in this pamphlet, actually a catalog section. These paints are of interest to the rubber industry because of their properties as protective coverings for rubber vulcanizing presses and heaters, storage tanks and pipe lines for latex, and for laboratory equipment and walls.

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Tag Industrial Thermometers. (Catalog No. 1125C.) C. J. Tagliabue Mfg. Co., Park and Nostrand Avenues, Brooklyn, N. Y. 8½x11 in. 24 pp.

Conveniently arranged listings of the complete line of industrial thermometers made by the company are contained in this new catalog. Interesting illustrations show the various forms, types and connections that fit industrial thermometer applications. In addition, a representative line of miscellaneous thermometers, including metal and wood back, cup case, hygrometers, etc., is described.

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Barometric Condensers. (Bulletin No. 9424.) Ingersoll-Rand Co., Phillipsburg, N. J. 8½x11 in. 20 pp.

The disc-flow, counter-current type of barometric condensers made by the company are illustrated and described in this new bulletin. In addition, there are diagrams showing their operation, complete specifications, suggested arrangements, and descriptions of auxiliary equipment usually used with them.

Book Reviews

Chemicals of Commerce. By Foster Dee and Cornelia T. Snell. Published by D. Van Nostrand Co., Inc., 250 Fourth Ave., New York City. 5½x8½ in. 542 pp. $5.00.

Edited for the practical man, or for the theoretical man looking for practical information, this book meets a definite need in that it is an excellent source of information on the composition of actual commercial products. Because there may be divided opinion as to what constitutes an "actual commercial product," the authors have used the price-quotation pages of current trade publications as the principal criterion of what is sold in sufficient quantity to fit in that category.

The book is designed to give in brief concise form the salient facts about any class of materials, the classification being by type of compound so that closely related substances will occur in the same chapter. For instance, crude, plantation, reclaimed, chlorinated and substitute rubber all appear in the chapter on "Natural Gums, Resins and Balsams." This same form is followed on calcium, hydrocarbons, phenols, esters, fats and fatty oils, etc. Each chapter starts with a discussion which gives the reader the general background and chemical nature of the particular group of substances included.

Chemicals of Commerce should prove useful to the chemist as a quick source of summarized information about products as a class. Laboratory workers, particularly, will find the summaries serve a useful purpose. The book has 37 chapters and a complete subject index.

Editorial Comment

ONCE AGAIN the Christmas Season is upon us and we take the opportunity to wish our good friends in the rubber and allied industries a very Merry Xmas and a Happy New Year. The fading year brought a return to better times for many in the industry and we hope that 1940 will bring Peace, Happiness and Prosperity to all rubber manufacturers and suppliers.

THE PUBLISHERS

Rubber Supplies

IN AN apparent effort to avoid a shortage of crude rubber in consuming countries due to the effects of the European hostilities, the International Rubber Regulation Committee, meeting in London last month, raised the export quota from the current 75% to 80% of basic quotas for the first quarter of 1940. Since the restriction agreement provides for an increase in the basic quotas next year, the move provides for a theoretical 300,330 tons to be exported in the first three months of 1940, as compared with 274,478 tons under present permissible shipments.

According to all reliable estimates, the increased supplies provided for under an increased quota should forestall any possibility of crude rubber shortages in consuming countries, particularly the United States which still accounts for approximately half of all rubber consumed annually, even taking into consideration losses which may be sustained by ships sunk at sea and over-delayed shipments. But there is another very important factor in these estimates which should be taken into consideration. Can producers of crude rubber meet an 80% allowance of basic quotas?

In other words, rubber producers in countries signatory to the restriction scheme have now been under quota regulations for some six years. Naturally, since only limited shipments could be made from each plantation, cultivation efforts have been generally held down since there was no point in producing more rubber than could be shipped. How much acreage can therefore be categoried as "unworked" can only be guessed at. How fast some of this acreage can be placed under workable conditions to produce profitable rubber is problematical. While it is only a matter of days or weeks to prepare for tapping operations on "unworked" acreage, remember the labor situation in the Middle and Far East is described as "tight."

This point is not being raised from any alarmist angle, since it is quite possible that producers will be able to supply sufficient rubber to total 80% of basic quotas, although we doubt whether there is any authority that can make a definite statement on that possibility at present. It is rather surprising, however, that the question has not heretofore been given consideration publicly, especially in view of the fact that quota increases were made steadily throughout the past year.

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Bales vs. Cases

LATE last month members of the Commodity Exchange, Inc., received copies of a proposed new rubber contract proffered by the Exchange's Board of Governors. The principal difference between the present contract and the proposed contract is that the latter would permit delivery of both baled and cased rubber whereas the former allows only the delivery of cased rubber.

The trend in recent years has been toward baled packings and less than 30% of rubber passing through New York is packed in cases. Therefore, permitting delivery of both baled and cased rubber would furnish a broader trading medium and would serve to stave off erratic price quotations by protecting the market against the possible development of "squeeze" conditions. It should be pointed out that American rubber manufacturers for the most part express no preference for cased over baled rubber in their purchases.

There are some manufacturers, however, who will continue to insist on cased rubber. This point has been taken into consideration by the Exchange and the new contract would have No. 1 ribbed smoked sheet in bales as its basis, with a provision for the same grade deliverable in cases at a fixed premium. The delivery of other grades would of course be permitted at fixed differentials.

CURRENT • NEWS of the Rubber Industry

DECEMBER, 1939

U. S. RUBBER OFFERS TO BUY FISK RUBBER

After weeks of rumor it was finally established early this month that the United States Rubber Company is negotiating for the purchase of the complete assets of the Fisk Rubber Corp. Shortly after the rumor was confirmed it was revealed that Fisk directors, at a special meeting held in New York City on December 5, had approved U. S. Rubber's offer to buy the business and assets, subject to liabilities, for $6,827,330 cash plus 109,981 shares of U. S. Rubber common stock. A special meeting of Fisk stockholders will be held on December 29th to consider the offer.

In the event of approval by stockholders, holders of Fisk preferred will receive $110 a share in cash and holders of common will receive approximately $6.75 in cash and ¼ share of U. S. Rubber common. Based on current quotations on U. S. Rubber common, the aggregate price for a share of Fisk common in cash and U. S. Rubber common is approximately $17.00.

Davis Issues Statement

F. B. Davis, Jr., president and chairman of the U. S. Rubber Company, made the following statement anent the negotiations:

"Needing additional production facilities to meet the requirements of our tire customers, we have been considering for several months different locations for another plant. Hearing recently that Fisk was using only a little more than one-half of its production facilities, we endeavored to work out an arrangement with that company for the manufacture of some tires for us.

"This proved to be impractical and we are now negotiating with the Fisk Rubber Corporation for their plant facilities and business.

"If these negotiations result in the purchase of the Fisk Corporation, it is our intention immediately to utilize more of the production capacity of the Fisk plants than is now being used.

"We consider it better for the industry generally to utilize existing capacity rather than build additional plants in an industry which already has over-capacity."

According to Colonel Charles E. Speaks, president of Fisk Rubber, if the deal is concluded the business of Fisk will be continued as a separate division of U. S. Rubber, with Fisk tires manufactured at the Chicopee Falls, Mass., plant and distributed through Fisk's dealer organization.

As soon as the negotiations were revealed, Whitfield Reid, former secretary and general counsel for the Fisk organization, organized a minority group of Fisk stockholders and served notice on the company that he might seek an investigation by the Securities and Exchange Commission or the courts on the offer by U. S. Rubber. He termed the transaction a "sell out" and registered full opposition to the purchase.

Fisk Termed Prosperous Concern

In a prepared statement, Mr. Reid termed Fisk "the most prosperous in the entire rubber industry today, having made a profit of $2.00 a share on common after preferred this year on a net annual sales volume of $18,000,000, which is an increase of 33% in the last two years." He also stated "there is absolutely no reason for selling this prosperous New England industry, which employs 2,200 New England people at Chicopee Falls and 1,100 in New Bedford."

In a telegram to several prominent stockholders, Mr. Reid intimated that U. S. Rubber would not be interested in continuing the operation of the Fisk properties "which require the payment of high Massachusetts taxes." He also stressed the point that U. S. Rubber ultimately will have no use for the fabric mill in New Bedford when it can supply all its needs from other factories in the south "especially since the freight differential has been removed."

Airplane Water Wings

To prevent navy craft from sinking when forced down at sea the United States Navy has adopted "airplane water wings." These "water wings," or flotation gear, consist of rubberized bags carried in compartments in wings or fuselage, which are automatically inflated by compressed carbon dioxide as soon as water strikes one of two detectors. The detectors, located at top and bottom of the fuselage, inflate the bags regardless of whether the ship pancakes, dives or lands in the water upside down, and work automatically even if the pilot is unconscious or has abandoned the plane by parachute.

RUBBER DIVISION PLANS NEXT MEETING

E. B. Curtis, of the R. T. Vanderbilt Company, New York City, Chairman of the Rubber Division, A.C.S., has announced that the Spring Meeting of the Division will be held in conjunction with the 99th Meeting of the American Chemical Society at Cincinnati, Ohio, the week of April 8, 1940. The Gibson Hotel has been selected as headquarters for the Rubber Division and members planning to attend the meeting are urged to make early reservations.

It has also been announced that all those who contemplate presenting papers at the Spring Meeting communicate promptly with H. I. Cramer at the University of Akron, Akron, Ohio, secretary of the Division, notifying him of the proposed subject. The deadline for receipt of complete papers by Dr. Cramer has been set for February 15.

Membership Committee Appointed

As provided for in the by-laws of the Division, adopted at the Boston meeting last September, Chairman Curtis has appointed a Membership Committee to stimulate enrollment in the Division. The Committee is headed by Charles R. Haynes, of the Binney & Smith Co., New York City, as chairman, and includes the following members:

R. E. Casey (Naugatuck), C. A. Bartle (DuPont), C. W. Christensen (Monsanto), H. E. Outcault (St. Joseph Lead), B. R. Silver (N. J. Zinc), W. W. Higgins (United Carbon), I. Drogin (United Carbon), C. P. Hall (C. P. Hall Co.), Carl J. Wright (General Atlas), A. C. Eide (American Zinc Sales), A. I. Brandt (Philadelphia Rubber Works), Carl Minnig (Continental Carbon), Fred Traflet (Pequanoc), Carl R. Shaffer (Xylos Rubber), G. K. Trimble (Mid-West Rubber Reclaiming), John Ball (Vanderbilt), A. E. Boss (Columbia Alkali), T. Bulifant (Barrett Co.), F. H. Amon (Cabot), J. H. Nesbit (U. S. Rubber Reclaiming).

Wright Erecting Addition

Wright Rubber Products Co., Racine, Wisconsin, manufacturer of rubber floor tile, stair treads and paving blocks, is erecting a one-story addition to its plant. The new addition, which will measure 40 x 120 feet, will cost approximately $6,000.

RUBBER SITUATION REVIEWED IN REPORT

The present situation respecting crude rubber, with special reference to the effect of the war upon United States imports, is described in a 37-page report just made available by the United States Tariff Commission, Washington, D. C. Copies may be secured without cost.

The report points out that approximately 97% of the world output of crude rubber is produced in British Malaya, Netherlands Indies, Ceylon, and other areas located in what is known as the Middle East. Shipments from this region are subject to the control of a committee established under the terms of the recent International Rubber Regulation Agreement.

Only a small quantity of crude rubber is produced in South America at the present time and it appears unlikely that South America will be able to supply more than a small part of the world demand within the next decade. Comparatively few rubber plantations have been established in that region, largely because of the South American leaf disease and labor uncertainties. Considerable time is needed to prepare land for planting and about 5 years are required for rubber trees to come into bearing.

A few American companies have plantations in the Middle East, Liberia, Brazil, Panama, Costa Rica, and Mexico. These plantations, however, supply only about 6% of the rubber requirements of the United States.

Stocks Declined Considerably

Stocks of rubber on hand in the United States declined from approximately 259,000 long tons on October 31, 1938, to 133,000 long tons on October 31, 1939, a supply sufficient for about 2½ months at the present rate of consumption. However, stocks afloat and destined for the United States amounted to 101,000 long tons on October 31, 1939, compared with 51,000 long tons on October 31, 1938.

The Regulation Committee will permit the export of approximately 623,000 long tons of crude rubber from areas under restriction in the 6-month period beginning October 1, 1939, compared with actual exports of 425,000 long tons in the corresponding period of a year ago.

It is expected that, as a result of the war, certain countries, notably Germany, will import less rubber than formerly, and with additional releases by the Regulation Committee, adequate quantities of rubber should be available in the Middle East for shipment to the United States.

The adequacy of domestic supplies of crude rubber in the future will depend largely upon how well normal ship movements are maintained between the Middle East and the United States. The proclamation of the President under the Neutrality Act does not restrict movements of American vessels to the Middle East. About one-half of the total United States imports of crude rubber in 1938 was carried by British vessels, one-fifth by Netherlands vessels, and one-fifth by American vessels.

Coming Events

Jan. 15-19. Annual Meeting, Society of Automotive Engineers, Book-Cadillac Hotel, Detroit, Mich.

Feb. 6. Los Angeles Rubber Group, Mayfair Hotel, Los Angeles.

Mar. 4-8. American Society for Testing Materials, Annual Meeting, Hotel Statler, Detroit.

April 8-12. Spring Meeting, American Chemical Society, Cincinnati, Ohio. (Headquarters of the Rubber Division will be at the Hotel Gibson).

Oct. 7-11. National Safety Congress, Stevens Hotel, Chicago, Ill.

The United States Maritime Commission has assured domestic manufacturers of rubber goods of its aid if a shortage of shipping facilities occurs. Imports of crude rubber from the Middle East increased steadily throughout the World War.

If a shortage of crude rubber occurs, this country will undoubtedly use much greater quantities of reclaimed rubber. In normal times the consumption of reclaimed rubber amounts to about 140,000 long tons a year, but reclaiming plants operating at full capacity could produce about 250,000 tons of reclaimed rubber, equivalent to approximately 125,000 tons of crude rubber, as about 2 tons of reclaimed rubber are generally required to displace 1 ton of crude rubber. The consumption of imported crude rubber amounted to 437,000 long tons in 1938.

Synthetic rubber and rubber obtained from guayule can be used as substitutes for imported crude rubber. At present the domestic production of synthetic rubber is less than 6,000 long tons yearly, and there is no commercial production of guayule rubber in the United States. In the event of a shortage of imported crude rubber, the production of these substitutes could be expanded, but probably from 1 to 4 years would be required before the industries would be in a position to produce even the minimum rubber requirements of this country.

Carbon Black Advanced

Prices for compressed and dustless carbon black used in the rubber industry were advanced this month. Current quotations applying to first quarter deliveries in 1940 are 2.30 cents per pound in bulk and 2.425 cents per pound in bags. These are carload prices, f.o.b. plants. The advances were anticipated due to the fact that consumption has been running far ahead of production in the past several months and because prices in effect during the present year were generally regarded as being too low. Prices on uncompressed black, little of which is now used in the domestic rubber industry, have also been increased by several suppliers.

U. S. CENSUS BUREAU LAUNCHES 1940 WORK

Approximately 200,000 establishments will be covered in the Census of Manufactures for 1940, forms for which have already been prepared. These establishments will be classified in some 400 separate industries, and separate statistics for these industries will be published for the census as a whole for each state, industrial area, county and city where the publication of the statistics does not disclose exactly or approximately the operation of a single establishment or a group of establishments under the same ownership.

One hundred and forty-seven special schedules, including a special form for the rubber manufacturing industry, one general schedule and one administrative office schedule will be used in the collection of data in the forthcoming canvass which gets under way in January.

The information to be presented in the census reports will include the number of establishments, number of proprietors, number of salaried employees and wage earners and salaries and wages paid during the year, cost of materials, fuel, purchased electric energy and contract work, value of products, and the value added by manufacture.

Questions of specific importance to rubber industry executives will be answered with statistics to be collected in the special census schedule for the rubber manufacturing field. At the same time there will be conducted a Census of Business which will provide facts about wholesale and retail channels of distribution for rubber products.

The questions to be asked have been chosen after consultation with leaders in the rubber industry so as to determine what information would be most useful to the trade. No facts are published concerning individual plants or companies, for reports to the Census Bureau are confidential and cannot be used for taxation, investigation or regulation. Nevertheless, answers to census questionnaires are required by law, and the promptness and accuracy with which they are given will determine the usefulness to the industry of the resulting census reports.

The breakdown of production by kind, which should provide executives with an accurate gauge of past trends in planning for the future, is quite detailed. Under boots and shoes, for instance, is listed rubber-soled canvas shoes, divided into base shoes, lace-to-toe trimmed shoes, plain oxfords and bals, and specialty oxfords and pumps; rubber boots, lumbermen's and pacs; arctics and gaiters, both buckle and automatic and style; and other shoes, rubbers and footholds.

Bolta Increases Wages

The Bolta Rubber Co., Lawrence, Mass., increased the wages of its 800-odd employees by 10% last month. The company, which manufactures combs among other hard rubber items, has been enjoying good business for several years.

EXCHANGE MEMBERS GET NEW CONTRACTS

Under date of November 27 the Board of Governors of the Commodity Exchange, Inc., New York City, sent out to its members proposals for a new rubber contract with provisions which would permit delivery of both baled and cased rubber. Only cased rubber is acceptable under the present contract. This move was predicted in our previous issue.

The trend in recent years has been toward baled packings and it is estimated that at present only 25% of all rubber passing through New York is packed in cases. Discussions regarding the advisability of changing the present contract have been going on for some time and have been hastened as a result of recent developments.

In a letter accompanying the proposed changes, the Commodity Exchange points out that it is axiomatic that a futures contract should provide for delivery of those grades of the commodity which predominantly enter into ordinary channels of commerce, and that price fluctuations in a futures contract market reflect demand for and supply of the commodity as a whole.

It is for this reason, the letter continues, that many commodity futures contracts call for delivery of a "Basis Grade," with other grades deliverable at premiums or discounts. The present Commodity Exchange rubber contract admits of delivery of about 15 per cent of the commodity entering into ordinary channels of commerce, and may reflect a scarcity of only one grade in one style of packing.

The rubber group of the Exchange feels that the base of the present contract is too narrow and that the interests of the exchange, and that of the rubber trade, including producers, consumers and dealers, require that the exchange furnish a broader trading medium.

It is the desire of Exchange officials to offer a contract having as its basis No. 1 ribbed smoked sheets packed in bales, with No. 1s in cases deliverable at a fixed premium and permitting the delivery of other grades at fixed differentials.

What other grades will be included and what the differentials shall be, and other pertinent factors, will not be determined until these matters have been thoroughly discussed in an open meeting, scheduled for mid-December, at which representatives of rubber manufacturers, members of the rubber trade who are not members of the Exchange, and others have been asked to attend.

Addition for Givaudan

Givaudan-Delawanna, Inc., manufacturers of aromatics and deodorants for the rubber and other industries, is erecting two new buildings at its Delawanna, N. J., plant. The new buildings, which will cost approximately $25,000, are needed to provide additional production facilities.

AKRON HOLDS ITS SECOND ANNUAL RUBBER BALL

Right: Leonard K. Firestone and Mary Gertrude Seiberling, King and Queen of the Ball, dressed in their regal raiment.

Below: W. E. Fouse, who represented Machinery in the Royal Pageant, and others representing General Tire & Rubber Co.

More than 4,000 people, approximately half of them in costume, attended the Second Annual Rubber Ball, held in the Akron Armory, Akron, Ohio, on Saturday, December 2. Leonard Firestone, son of the late Harvey S. Firestone, and an executive of the company founded by his father, served as "King" of the ball, while Miss Mary Gertrude Seiberling, daughter of J. Frederick Seiberling, and granddaughter of F. A. Seiberling, was "Queen." The event was again sponsored by the Women's Art League of Akron.

Costumes worn by the "royal court" were significant of the rubber industry, representing its various components and the four basic elements of earth, air, water and fire. The costumes also portrayed such contributing factors as transportation, power, chemistry and machinery. Courtiers, appropriately costumed, included Harry Blythe (Goodyear), W. E. Fouse (General Tire), T. G. Graham (Goodrich), Lee Jackson (Firestone) and J. L. Cochrun (Seiberling).

A group of Firestone "farmers" and "farmerettes," wearing checked gowns of rubber-like material and broad-brimmed hats, took top honors in the group classification at the ball in an act called "Farm on Rubber." Jane House, noted model, wearing a regal, long-trailing gown of Koroseal, took second prize. Third prize went to four tall black-clad "dictators", one of whom was J. E. Trainer (Firestone) as "Hitler", and another Nils Florman (National Rubber Machinery) as "Chamberlain." Several prizes for individual effort were also awarded. John Sloan, dean of American painters, headed the judging committee.

There were numerous ingenious costumes worn at the ball. One of these was a tuxedo, complete in every detail, woven by hand on a loom by a Goodyear employee, of rubber-like material. Another was a dress shaped like a Christmas bell. A third was a wedding gown for the "bride of tomorrow" made completely of Koroseal. Colonial costumes made of Pliofilm were in appearance. Two Firestone employees came garbed as "rubber checks." Robert Wilson (Goodyear)) wore a costume made of natural, cream-colored rayon silk cord.

The ball was deemed highly successful by Mrs. Wilbur Pearce, who acted as chairman of the Rubber Ball Committee. Proceeds are used to encourage students at the Akron Art Institute. As in the case of the first rubber ball, the second served to center the interest of the nation on Akron and its rubber products.

Papers on Farm Tires

The use of tires on farm equipment occupied an important part of the Fall Meeting of the American Society of Agricultural Engineers, held in the Stevens Hotel, Chicago, on December 4 to 8. The following papers were given at one of the sessions held by the Power and Machinery Division of the Society: *Pneumatic Tire Research Study, A Report of the A.S.A.E. Committee on Transport Wheels,* by Dr. E. G. McKibben (Iowa Agricultural Experiment Station); *Results of 1939 Field Studies of Dual Tractor Tires,* by C. W. Smith (University of Nebraska) and E. C. Sauve (Michigan State College); *Effect of Liquid Ballast on Bouncing of Tractor Tires,* by H. W. Delzell (B. F. Goodrich Co.); and *Rubber Tires for Farm Vehicles,* by W. S. Lockwood (Crude Rubber Development Bureau).

In addition to these papers, the Committee on Transport Wheels held a round-table discussion on the report on the pneumatic tire research study being conducted at the Iowa Agricultural Experiment Station. Executive offices of the American Society of Agricultural Engineers are maintained in St. Joseph, Michigan.

FINANCIAL NEWS

Columbian Carbon Co.

First Nine Months: Net profit of $2,380,330, equal to $4.43 a share on 537,406 common shares, which compares with $1,944,458, or $3.62 a share, for the corresponding period of the previous year. Current assets on September 30, 1939, amounted to $7,456,426, including $3,905,409 in cash and marketable securities at cost, and current liabilities to $864,033, as compared with $5,841,471, of which $2,711,715 was in cash and marketable securities, and $910,989, respectively, on the same date a year ago.

Raybestos-Manhattan, Inc.

First Nine Months: Net income of $1,069,926, or $1.69 per share, after providing $526,685 for depreciation and $263,296 for Federal and state income taxes, which compares with a net loss of $57,167, after providing $561,504 for depreciation, in the corresponding period of the previous year. Current assets as of September 30, 1939, amounted to $9,811,686, approximately nine times the current liabilities. Total assets were shown at $18,610,298.

United Carbon Co.

First Nine Months: Net profit of $1,107,715, after depreciation, depletion, Federal and state income taxes, and other charges, equal to $2.78 on each of 397,885 shares of no-par common stock. This compares with $1,143,906, or $2.87 a share, earned in the first nine months of 1938. Current assets on September 30, 1939, amounted to $3,808,703 against current liabilities of $927,355, as compared with $3,757,361 and $763,735, respectively, at the end of September, 1938.

Pharis Tire & Rubber

Year Ended October 31: Preliminary report indicates a net profit of $450,000, equal to slightly more than $2.00 each on 220,000 shares of common stock. No comparison with the previous year is available since the company changed from a calendar year to a fiscal year basis in the period reported on. For the ten months ended on October 31, 1939, net profit amounted to $455,084, or approximately $2.07 a share.

Norwalk Tire & Rubber

Year Ended Sept. 30: Net profit of $180,592, equal to 74 cents a share on 202,230 common shares after preferred dividends, which compares with $111,195, or 40 cents a share, in the previous year. Total income before depreciation for the 1939 period was $281,390. Gross sales amounted to $3,785,181, as compared to $2,785,865 reported for the previous year.

Mohawk Rubber Co.

First Nine Months: Net profit of $293,244, equal to $2.22 each on 132,138 shares of stock, which compares with $219,679, or $1.66 a share, last year. The company has enjoyed good business for some time after showing steady losses for a number of years.

Brown Rubber Co.

Third Quarter: Net profit of $7,447, which compares with a net loss of $54,333 in the corresponding quarter of the previous year. The company reports that business has picked up considerably in recent months.

Baldwin Rubber Co.

Year Ended Sept. 30: Net profit of $334,613, equal to $1.05 each on 316,592 shares of $1-par capital stock, which compares with $19,986, or 6 cents each on 316,757 capital shares, in the year ending September 30, 1938.

Table Association Plan

Plans for the formation of a new association of rubber manufacturers, the major objective of which was the furtherance of crude rubber cultivation in the Western Hemisphere, particularly in the Latin-American countries, have been temporarily tabled. A representative group of manufacturers met in Cleveland in June of last year and organized themselves into what was given the temporary name of the American Crude Rubber Association. According to Stewart N. Clarkson, of New York City, trade association specialist, to whom was entrusted the task of organizing the new group, the matter has been tabled until more positive results from rubber-cultivating efforts now being fostered by American manufacturers in South America are received and studied.

Rubber at Hotel Show

Several rubber manufacturers, and a few distributors of rubber products, exhibited their wares at the 24th National Hotel Exposition, held at the Grand Central Palace in New York City the week of November 13. The Bolta Rubber Company exhibited its complete line of "Boltalite" trays, ice tubs, cutlery boxes and other hard rubber products for the hotel and restaurant trade; Firestone Tire & Rubber Company showed its "Airtex" mattresses and seat cushions; Dunlop Tire & Rubber Corporation displayed its "Dunlopillo" mattresses, pillows and upholstery materials; and American Mat Corporation featured its line of "Ezy-Rug" and "Counter-Tred" floor mats.

RUBBER TIE PLATES FOR NEW YORK SUBWAY

The first step in a comprehensive program to engineer noise and vibration out of subway operation in New York City will be taken early next year when rubber tie plates will be installed along six miles of subway trackage on the city-owned Independent Subway System. The Board of Transportation has awarded a contract for the manufacture and installation of the plates to the Firestone Tire & Rubber Company, Akron. The plates consist of a rubber cushioning element encased in a steel harnessing jacket.

Result of Cooperative Development

The order resulted from a cooperative development started in July of 1938 when a stretch of trackage was equipped with the rubber tie plates. Extensive sound and vibration tests taken before and after the plates were installed resulted in a report that the "rubberized installation reduced the transmission of vibration and noise through the roadbed into adjacent buildings by as much as 92% and that vibration on trains and station platforms were substantially reduced as well."

Rubber tie plates are not without a safety factor, Firestone engineers point out. Investigation has revealed that the lateral distance between rails set on rubber may be less than the required distance of ordinary installation. By moving the rails closer together, a "pinching" of wheel flanges is made possible by the flexing action of the rubber. Thus, the moving car maintains a constant wheel-rail contact which has a tendency to stabilize the car traveling at speeds of 40 miles per hour or greater.

Association Elects Officers

A. L. Grant, vice-president of the C. T. Wilson Co., New York City, was elected president of the Rubber Trade Association of New York, Inc., at a meeting of the directorate of that organization held on November 9. William E. Bruyn, of Littlejohn & Co., Inc., and Louis V. Keeler, of the Avia Co., were elected vice-president and treasurer, respectively. B. G. Davy was reappointed secretary-manager of the Association, which maintains headquarters at 95 Broad Street in New York City.

Urges Price Protest

Paul Hoffman, president of the Studebaker Corporation, South Bend, Indiana, appearing before the governmental committee investigating war profiteering in Washington, D. C., on December 6, urged that diplomatic representations be made to Great Britain because of what he claimed were unjustified increases in the price of rubber since outbreak of the European conflict. It was believed that no action would be taken on the suggestion, several senators calling it "entirely impractical."

WM. C. HOLMES HEADS LOS ANGELES GROUP

William C. Holmes, manager of the Los Angeles office of the Dill Manufacturing Company, was elected Chairman of the Los Angeles Rubber Group at a meeting held at the Mayfair Hotel in Los Angeles on December 5. Mr. Holmes, who served as vice-chairman during the past year, succeeds Garvin Drew, of A. Schrader's Son. Mr. Drew, incidentally, was recently transferred to the Brooklyn, N. Y., offices of the company.

Other officers elected for the 1940 season included Bert Dougherty (B. E. Dougherty Co.) as vice-chairman; W. C. Reeder (U. S. Rubber) as secretary; and L. F. MacDonald (Goodrich) as treasurer. Directors included Charles J. Roese (Goodyear), Carl Stentz (Latex Seamless Rubber), Fred Woerner (C. P. Hall Co.), and Mason L. Paine (Firestone). Montel Montgomery (Martin, Hoyt & Milne) and W. J. Haney (Kirkhill Rubber) were the retiring secretary and treasurer, respectively.

The two chief speakers at the December meeting were Harold Adams, chief of the landing gear division of the Douglas Aircraft Co., who discussed the primary differences between airplane and automobile tires, and Gilbert R. Carlock, head of the LaSalle Extension University on the Pacific Coast, who talked on "America First," a patriotic address urging non-implication by the United States in European politics or quarrels.

The door prize of the evening, donated by Lombard Smith & Co., by Mr. Smith himself, was won by Carl Stentz, while the special prize, a table radio, donated by D. Hecht & Co., through their representative, Fred Ehrlich, went to E. H. Lewis of the Western Insulated Wire Co. Table favors, consisting of mechanical lead pencils, were donated by Ed Royal of H. M. Royal, Inc.

No meeting of the Group will be held in January because of the closeness of the regular meeting date to the Christmas holidays. Meetings will be resumed on the first Tuesday in February.

Canadian Group Meets

Approximately 40 members and guests attended a meeting of the Rubber Section of the Canadian Chemical Association held at the University of Toronto, in Toronto, Canada, on November 24. The meeting was preceded by the usual dinner. The speaker of the evening was Bertrand Robinson, district manager of the Hardinge Co., Inc., of Toronto, who discussed "An Outline of Canadian Mining and Milling Methods." Following this address, a discussion took place on the use of rubber products in the mining industry of Canada. Mr. Robinson was accompanied by three mining experts who assisted him in answering numerous questions raised during this discussion.

Drawing of New U. S. Rubber Building

U. S. RUBBER TO MOVE ITS GENERAL OFFICES

Sometime in March of next year the United States Rubber Company will move its general offices from its present building at 1790 Broadway in New York City to Rockefeller Center. The last building in the "city within a city", now nearing completion, will bear the name of the company.

The new United States Rubber Company Building consists of 20 stories and is located at 48th Street and Sixth Avenue. The eleven upper floors of the building will be occupied by the principal executive and management offices of the company. These offices will occupy 60% of the total floor space of the building. All of the latest improvements in office building construction are to be incorporated, including air conditioning.

The leasing agreement for the new building runs for more than a decade, according to a joint announcement by F. B. Davis, Jr., president of U. S. Rubber, and Rockefeller Center, Inc. A contract of sale has been arranged covering U. S. Rubber's present building on Broadway which it has occupied for the past 27 years. The purchaser is forming a new corporation, the sponsors of which have not yet been announced.

Rubber Flooring for "America"

When the United States liner "America," largest merchant ship ever constructed in this country, is completed, it will have the additional distinction of being one of the world's most luxuriously appointed vessels. Contributing to this distinction will be approximately 125,000 square feet of rubber tile and sheet flooring rubber, all of which is being supplied in special, made-to-order colors. In all there will be 25 different colors and practically all public areas of the ship will be covered with rubber. Goodyear Tire & Rubber Company, Akron, is handling the entire installation.

WALTON CHAIRMAN OF BOSTON RUBBER GROUP

James C. Walton, of the Boston Woven Hose & Rubber Company, was elected chairman of the Boston Group, Rubber Division, A.C.S., at a meeting of the Group held at the University Club in Boston, Mass., on December 8. H. S. Liddick (Davidson Rubber) was elected vice-chairman and D. D. Wright (Hood Rubber) secretary-treasurer. L. R. Clarke (Haartz-Mason-Grower) and H. P. Fuller (Pequanoc) were elected to the Executive Committee.

Approximately 165 members and guests attended the meeting, which was preceded by an excellent dinner. Before dinner, the Godfrey L. Cabot film, "Inside the Flame," which illustrates the physical and chemical properties of carbon blacks, together with their production and uses, was shown. Election of officers was held immediately after dinner.

The three prize-winning papers of the Technical Paper Contest conducted earlier this year by the New York Rubber Group, which were given at the last meeting of that group, constituted the technical portion of the meeting. These papers, together with their authors, were: *A Critical Analysis of the T-50 Test for State of Vulcanization*, by George R. Vila (Naugatuck Chemical); *Measurement of the Plasticity of Rubber*, by Wm. M. Widenor (Lee Tire); and *T-50 Test as a Control for Inner Tubes*, by Wm. B. Dunlap, Jr. (Lee Tire). Because of the nature of the papers considerable interest was shown in a T-50 apparatus displayed at the meeting by the Henry L. Scott Company.

A report made by Mr. Walton in his capacity of secretary-treasurer of the group for the past year showed there was a total paid-up membership of 149, and that $205.80 was in the treasury. The meeting wound up with the distribution of door prizes, made possible by donations received from the following concerns: Godfrey L. Cabot, Inc., Continental Carbon Co., E. I. du Pont de Nemours & Co., Wm. D. Egleston Co., C. P. Hall Co., Krebs Pigment & Color Co., Monsanto Chemical Co., New Jersey Zinc Co., Pequanoc Rubber Co., THE RUBBER AGE, Henry L. Scott Co., United Carbon Co., and L. G. Whittemore, Inc. The Group, itself, also supplied several of the prizes distributed.

National Sues McNeil

National Rubber Machinery Co., Akron, filed suit in the Federal Court at Cleveland on November 26 against the McNeil Machine & Engineering Co., also of Akron, on the grounds of patent infringement. National claims that letters patent were issued to Cato Iverson, inventor, and to itself as assignee, on August 8, 1939, for an invention covering vulcanizing molds and other processes and that the McNeil concern was "making, selling and using vulcanizing presses containing, embodying, and employing the patented invention." The suit asks for an injunction and an accounting.

STATUS OF LABOR REVEALED IN SURVEY

The status of the labor movement in the rubber industry was the subject of an article in a recent issue of the *Monthly Labor Review* which has just been made available in a reprint under the title "Collective Bargaining by United Rubber Workers" by the Bureau of Labor Statistics, United States Department of Labor, Washington, D. C. Copies are available from the United States Government Printing Office.

Tracing the organization of the labor movement in the industry since 1933, the survey, prepared by Harry Cannon of the Bureau's Industrial Relations Division, covers such factors as duration of existing agreements, union status and employment, wage rates and other pay provisions, learners' rates, hours and leave provisions, provisions for slack work, seniority, settlement of grievances, and other important employer-employee questions embodied in agreements.

Most of the labor agreements, the survey reveals, extend for a period of one year, seven months being the shortest term for any agreement and two years the longest. There are now 56 signed agreements between rubber manufacturers and the United Rubber Workers of America, about two-fifths of which continue from year to year unless they are canceled or revised by required notices. Some agreements, including those with Firestone and Goodrich, have provisions to the effect that the old agreements continue if no new or revised contract is agreed upon by the termination date.

Bargaining Position Discussed

The union is the exclusive bargaining agency for all employees in 90% of the plants under agreement, according to the survey, only a few agreements making no mention of the union's bargaining position. To prevent the regrowth of employee - representation plans, several agreements, including those with Firestone and U. S. Rubber, prohibit any aid or financial support by the company to any other groups or labor organizations which purport to engage in collective bargaining. Virtually all of the signed agreements prohibit discrimination against employees for membership in the union.

Because of the complicated structure of piece-rate wages of the rubber industry it was necessary to set rates by day-to-day negotiation between management and union rather than by inclusion of piece-rate schedules in most agreements. Consequently, wage provisions are generally confined to establishing minimum rates. Such rates were established for complete plants in 27 agreements. Differentials on the basis of sex were established in 21 of those contracts, provision being made for women to receive 5 cents an hour below rates paid to men.

More than half of the 56 agreements in force have some type of share-the-work provision for slack periods. Some provisions specify that before any lay-off occurs hours must be reduced, usually to 24, 30 or 32, for a given number of weeks varying from three to eight. At the end of such periods, if lay-offs are still essential, seniority generally governs the lay-off policy. The Goodrich agreement, for example, provides that no reduction in the regular working force of any department is to be made until hours are reduced to an average of less than 24 for 3 consecutive weeks.

Seniority provisions regulating lay-offs, re-hiring, transfers, and promotions are found in all but two agreements. These range from a simple declaration that the union and employer subscribe to seniority principles to the detailed service-credit rules found in the Goodrich and a few other agreements. In a majority of the labor contracts, including those covering all of the larger companies, departmental seniority is the determining factor in selecting employees for transfer, promotion, lay-offs, and re-hiring. Separate seniority lists for men and women are established in two agreements.

Practically all of the agreements establish some form of shop-committee system for the settlement of grievances, according to the survey. In smaller plants only one shop committee, directly elected by the entire plant, is provided for, but in larger plants, such as Firestone, Goodrich, U. S. Rubber and General Tire, where numerous departments exist, the agreements call for the election of representatives within departments. The chairmen of these department committees then form division committees and the heads of division committees make up a plant committee. The number of representatives constituting a committee is regulated in most agreements.

30 x 3 Size Tires

There are still enough owners of 1925 and earlier Model T Fords for tire manufacturers to continue making 125,000 of the old 30 x 3 tires annually, according to engineers of the Fisk Rubber Company. At the present rate of car mortality, as evidenced by these tire sales, the end of these famous models will not be reached for another four or five years. In 1938, approximately 375,000 tires of the 4.40 x 21 size, second oldest tire still in use, were produced for 1927 Fords, Stars and Overlands.

Large Fire Hose Order

The British Government has placed an order with the Goodyear Tire & Rubber Company for forty-four and one-half miles of woven single jacket fire hose. It is understood that the hose is being purchased to supplement the existing fire fighting equipment in the British Isles essential in air raid decontamination and fire protection. The order is being handled in the Akron plants.

80% QUOTA IS SET FOR 1940 QUARTER

The export quota rate for the first quarter of 1940 for all countries signatory to the current restriction scheme was set at 80% of basic quotas at a meeting of the International Rubber Regulation Committee, held in London, England, on November 15. This compares with current allowable exports of 75%. The increase came as no surprise to the trade.

It is believed that the increased quota action was taken primarily in view of the growing consumption trend in the United States, a new all-time monthly peak of 55,764 tons being reached in October. Moreover, although a sharp increase in rubber afloat in recent months has been recorded it has failed to relieve the tightening rubber supply situation in consuming countries, apparently because of delayed shipments.

The advance in permissible shipments for the first quarter of the coming year will increase potential supplies of rubber considerably, since another increase in the basic quotas goes into effect at the same time under the terms of the restriction agreement. The basic rubber quota for 1940 for all agreement countries, except Thailand (Siam) and French Indo-China, has been fixed at 1,486,250 tons, as compared with 1,464,500 tons in 1939. Thus, the 80% quota for the first quarter provides for 300,330 tons, as compared with 274,478 tons under the 75% quota now in effect.

SEIBERLING LATEX WINS PATENT SUIT

Seiberling Latex Products Co., Barberton, Ohio, was upheld in its suit against the Surety Rubber Co., Carrollton, Ohio, in a decision handed down by Judge Paul Jones in the Federal Court at Cleveland on December 7. In announcing the decision on the year-old suit, the court held that Surety was infringing upon patents for an invention used in the manufacture of rubber gloves held by Seiberling Latex. At the same time, Judge Jones handed down a decision holding that the Canton Rubber Co., Canton, Ohio, was not infringing on the same patent.

The court ordered an injunction against Surety's use of the patent, a full accounting of its sales of gloves during the three years covered by the suit, and subsequent damages to Seiberling Latex. No estimate was made as to the possible amount of damages. It is believed that the decision will be appealed, although no action was taken by this writing.

Christmas Parties Held

Annual Christmas parties were held by the New York, Detroit and Chicago Rubber Groups of the Rubber Division, A.C.S., in their respective cities, on Friday, December 15. Special entertainment and features were planned by each of the three groups. Complete reports on each event will appear in the next issue.

Names in the News

GUY GUNDAKER, JR., associated with the B. F. Goodrich Co., Akron, since 1924, has been appointed special representative to R. MCTAMMANY, assistant general sales manager of the Goodrich tire division. During the New York World's Fair Mr. GUNDAKER acted as resident manager of the Goodrich exhibit.

R. H. GOEBEL, secretary, Rubber Manufacturers Association, was elected a director of the National Council of Private Motor Truck Owners, Inc., at a meeting held on November 27. He will serve a one-year term.

RICHARD RILEY, formerly associated with the Cleveland office of the B. F. Goodrich Company, has been named assistant general sales manager for the Mansfield Tire & Rubber Co., Mansfield, Ohio.

C. J. FARCASAN, who retired from active duty with the Stauffer Chemical Company ten years ago because of ill health, has returned to the New York office of that company. Before coming to New York he spent some time at the Akron offices of the company.

THOMAS W. ESTABROOK, formerly manager of purchasing for the Brown Company at Berlin, N. H., before he resigned to join the Eastern Corporation, has returned to that post with the Brown Company. The company makes artificial leather products among others.

HARRY BLYTHE, manager, tire sales, Goodyear Tire & Rubber Co., Akron, addressed the Canton (Ohio) Junior Chamber of Commerce at Canton on December 4. He predicted a business boom in 1940, but warned that the national debt must be balanced if prosperity is to stay with us.

DOUGLAS F. G. ELIOT, general commercial manager of Western Electric Company for the past three years, has been appointed general purchasing agent, effective December 11. He has been with the company since 1911.

HARRY L. FISHER, of the research laboratory, U. S. Industrial Chemicals, Inc., Stamford, Conn., gave a short talk on "Modern Rubber Industry" to a group of chemical engineering students visiting the Chemical Exposition at the Grand Central Palace in New York City early this month.

R. L. FORNEY, assistant to the managing director of the National Safety Council, 20 North Wacker Drive, Chicago, will become director of the Council's Industrial Division on January 1, 1940. He replaces W. DEAN KEEFER who served the Council for 21 years.

J. S. WEARE, manager of the Chicago office of the Cambridge Rubber Company, Cambridge, Mass., for the past ten years, has been named sales manager for that company. He will maintain headquarters at the general offices in Cambridge.

T. W. CASEY, vice-president, Seiberling Latex Products Co., Barberton, Ohio, was recently elected a vice-president of the Toy Manufacturers of the U.S.A. He has been active in the affairs of that organization for many years.

ROY W. COLLINGS was appointed head of the newly created Business Development Department of the U. S. Tire Dealers Corporation last month. F. M. STEWART, for the past few years advertising and sales promotion manager for the company, succeeds MR. COLLINGS as manager of the Automobile Tire Department.

J. T. STAKER has been appointed manager of the fleet sales division of the truck and bus tire department of the B. F. Goodrich Co., Akron. He has been with the company since 1928 and was formerly in the mileage contracts division.

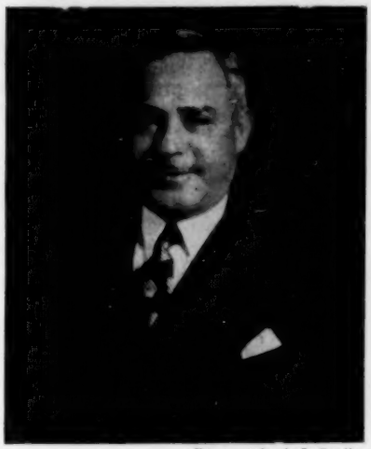
FREDERICK R. ROWE, associated with the O'Sullivan Rubber Company for the past 14 years, many of which were spent as factory manager of the Gettysburg, Penna., plant, has resigned from that company to join the Hagerstown Rubber Co., Hagerstown, Maryland, as factory manager. He takes the place of RICHARD C. MURRAY who recently resigned to become factory manager of the Beebe Bros. Rubber Company at Nashua, N. H.

WALLACE C. HUTTON, vice-president and treasurer of the Seamless Rubber Co., New Haven, Conn., has been elected a director of the Morris Plan Bank of New Haven. He is also a director in several other financial and civic movements.

E. J. THOMAS, executive vice-president, Goodyear Tire & Rubber Co., Akron, was the principal speaker at the Sixth Annual Convention of the Ohio Automotive Association, held at the Neil House in Columbus, Ohio, on December 5. He discussed "Some Phases of Progress."

LOUIS H. BRENDEL, associated with Manning, Maxwell & Moore, Inc., Bridgeport, Conn., for a number of years, has been made assistant to C. H. BUTTERFIELD, general sales manager of the company. He will supervise sales promotion and jobber relations for several divisions of the firm.

Drogin Joins United Carbon



Photo, Blank & Stoller

Dr. I. Drogin, associated with J. M. Huber, Inc., since 1922, occupying the post of chief chemist for that company for a number of years, has joined the staff of United Carbon Co., Inc., as director of research. He will make his headquarters at Charleston, West Va.

Dr. Drogin was born in Bialystok, Poland, in December of 1891. Coming to this country at an early age, he received his education at the City College of New York, University of Pittsburgh, and Mellon Institute. He was under a research fellowship at Mellon Institute. He entered the rubber industry in 1922 in Swartz, Louisiana, as a chemist for the Huber organization in charge of the manufacture of carbon black for the rubber field.

A member of several scientific institutions, as well as fraternal groups and clubs, Dr. Drogin has contributed several excellent technical papers to the rubber literature. Some of his more recent papers included "An Outline of Carbon Black," "Carbon Black for the Process Industries," and "A Survey of Methods for Evaluating Carbon Blacks." The latter paper was delivered at the Rubber Technology Conference held in London, England, in May, 1938.

Morris with Naugatuck

Harold B. Morris, associated with the Firestone Tire & Rubber Company for the past nine years, the last two of which were spent in research development at the new Fall River, Mass., plant, has resigned from that company to join Naugatuck Chemical, a division of the U. S. Rubber Company, and Dispersions Process, Inc., an affiliated concern. He will represent Naugatuck on latex and Lotol and Dispersions Process on Dispersite in the New England area. Mr. Morris will make his headquarters at Naugatuck's Boston office, located at 560 Atlantic Avenue.

CARL J. MINNIG, sales manager, and C. E. MCKINNEY, superintendent, of the Continental Carbon Company, have been promoted to the offices of Vice-President in Charge of Sales and Vice-President in Charge of Operations of that company, respectively.

Los Angeles News

Herbert E. Smith, vice-president of the United States Rubber Company, spent several days in Los Angeles this month inspecting the local plant and studying western markets. Mr. Smith stated that as yet the war in Europe had not affected the rubber industry so as to alter the price situation but he stated further that if the war should extend to the Pacific waters the story might be different. In referring to business conditions he stated that the business pick-up continues strong aside from any stimulus of munition makers. He also said that if the war continues in Europe 1940 will be a bigger year than 1937 in the rubber industry, but that if the war stops 1940 will be about equal to 1939.

J. A. Hoban, general manager of the retail sales division of the B. F. Goodrich Company, was in Los Angeles this week while on a nation-wide tour to various important business centers. While here he conferred with officials of the local plant. "The year 1940 looks like a good tire replacement year on trucks," said Mr. Hoban, "and prospects are for a big volume in 1940. Tire prices are today the lowest since 1937."

Charles H. Churchill, Los Angeles manager for H. Muehlstein and Company, Inc., has returned from a business trip that took him to New York and Chicago.

Claus H. VonderReith, one of the proprietors of the Sierra Rubber Company, Los Angeles, reports a very rare experience while fishing for salmon in the State of Washington. He had fished all day without results and had dozed off to sleep in his boat. When he awoke he found that a trout had jumped into the boat, his only catch for the day.

C. A. Carlton, manager of the development department of J. M. Huber, Inc., Borger, Texas, was in Los Angeles and vicinity in November contacting the trade interested in carbon black.

Edward L. Royal, local manager for H. M. Royal, Inc., was due back in Los Angeles on December 15, concluding a four weeks' business trip which took him to Trenton, N. J., New York, Washington and Chicago.

K. W. Faulhaber, proprietor of the Faulhaber Rubber Company, has returned from a hunting trip which took him to various places in Utah and Montana.

T. Kirk Hill, of the Kirkhill Rubber Company, has purchased a site for additional production, assembly and warehouse facilities located in the general vicinity of his main plant. This will add 14,000 square feet of floor space, while some 4,000 square feet of floor space now rented for warehouse facilities will be abandoned. New mills and a tubing machine will be added and some equipment will be moved from the main plant which has been slightly crowded, Mr. Hill states. Mr. Hill reports his year closing with a gross increase in business of 25 per cent over 1938. January 1 will conclude three years of three shift "around-the-clock" operation without the loss of a day's time.

A. S. Rocklen, manager of The Golden State Rubber Mills, Los Angeles, spent the early part of December in Chicago on business.

Raymond B. Stringfield, chemical engineer with laboratory at 229 S. Normandie Street, Los Angeles, the organizer of the Los Angeles Rubber Group back in 1927, is in the midst of a series of appearances at 360 high school and college assemblies throughout the western states under the auspices of the National School Assemblies Association. His subject, presented in lecture and demonstration, is "Chemistry in Every Day Life." He completed 180 appearances by December 1 and will make the other 180 during the winter months after New Year's.

Beginning late in March Mr. Stringfield will offer a course at the University of Southern California on rubber technology and compounding. This will occupy twelve evenings and be open to the rubber industry as a whole. It is estimated that about 100 members of the Rubber Group have in the past taken similar courses at U.S.C. under Mr. Stringfield.

A. D. McPherson, office manager and head of the purchasing department for the B. F. Goodrich Company in Los Angeles, in November completed his 20th year of continuous service with this company. Mr. McPherson began work in the Akron plant in 1919.

Children's Christmas parties were scheduled by at least three of the "Big Four" tire and rubber plants in Los Angeles. The party at the B. F. Goodrich Company plant, to which the children of all employees were to be invited, was to take place on the grounds in front of the building on the morning of December 13. There was to be a Christmas tree and Santa Claus was to distribute presents. Approximately 700 children were expected.

At the Goodyear plant, where the big party was to be held December 23, Santa Claus was due to arrive in the new Goodyear blimp at 9 A.M. Counting parents and children about 2,000 were expected at this party. A big Christmas tree and distribution of presents were to be features of the event.

Two thousand including children and parents were expected at the U. S. Rubber Company's Christmas party on the evening of December 16 at the big Golden Gate Theatre. Motion pictures were scheduled and Santa Claus was signed up for an official appearance with presents for everybody.

The new Goodyear blimp, "Resolute," has arrived in Los Angeles replacing the "Volunteer," which has been on duty here for ten years. The old ship was flown back to Akron where it was to be dismantled. During its time on the west coast it flew 811,575 miles; carried a total of 45,389 passengers; spent 18,035 hours in the air; and made 26,839 flights. Pilot-Captain A. T. Sewell flew the ship a total of 6,850 hours. The "Resolute" is larger than the "Volunteer." It is 150 feet long and 42 feet in diameter with accommodations for six passengers as compared with the "Volunteer's" accommodations for four.

P. L. Dildine, Manager of Factory Standards in the Goodrich plant at Akron, spent several days in November in the Los Angeles plant. He also visited various points of interest on the west coast. J. V. Molesworth, director of personnel work at Akron, also spent part of November in Los Angeles.

Due to increased business from the oil fields the D & M Machine Works, Torrance, has found it necessary to make a number of expansions throughout its plant, according to W. E. Shawger. Two new engines have been added to the generating plant to supply more d.c. current for the foundry, while the old 100 h.p. boiler has been removed and a new 150 h.p. boiler installed. A new steam engine and a hydraulic pump have also been added to the equipment.

Piston business at the plant has increased to the extent that it has become necessary to make four more 24-inch presses to accommodate orders. The presses are designed and built by the company which plans to add six more of them in the near future to take care of a special line of mechanical goods. All departments at the plant are operating 16 hours per day.

Reverse Mat Judgment

The Sixth Circuit Court of Appeals, sitting in Cincinnati, on November 15 reversed the decision of Judge E. A. O'Brien of the Federal Court at Detroit in the case of Paine & Williams Co. *vs.* Baldwin Rubber Co. The Federal court had awarded Paine & Williams a judgment of $101,491 in its suit against Baldwin for royalties allegedly due in the manufacture of automobile rubber floor mats. The Appellate court, in reversing the decision, held that "we find no substantial evidence in the record to support the judgment."

CHEMICAL EXPOSITION IS HELD IN NEW YORK

Record crowds attended the 17th Exposition of Chemical Industries, held at the Grand Central Palace, in New York City, the week of December 4. The exposition, held under the direction of the International Exposition Company, was one of the largest of the seventeen shows held to date.

The theme of the American Chemical Society's exhibit was "Chemistry Catalyzes Commerce," and a series of enlarged photostats depicted advances made in the rubber, resin, paint and varnish, equipment, petroleum, food, pulp and paper, chemical and other industries. Examples of specific products resulting from recent research in each of these industries were displayed beneath these various photostats. A new rubber filter media, developed by the Filter Media Corporation, Irvington-on-Hudson, N. Y., was displayed under the photostat depicting progress in rubber research.

As usual, there was a great variety of chemical processing equipment on exhibit, much of it of specific interest to the rubber industry. Mixers suitable for use in the rubber laboratory and factory were shown by the Baker Perkins Co. and by J. H. Day Company; platen presses were displayed by the Hydraulic Press Mfg. Co. and by Watson-Stillman, Inc.; ball and pebble mills for latex work were seen in the booths of the Abbe Engineering Corp. and the Premier Mill Corp.; colloid mills were exhibited by Chemicolloid Labs., Inc., and Manton Gaulin Mfg. Co.

Variety of Laboratory Equipment

A wide variety of laboratory and plant testing, recording and control instruments was featured by eleven different manufacturers, *i.e.*, the American Instrument Co., Atlas Electric Devices Co., Bristol Co., Brown Instrument Co., Cambridge Instrument Co., Foxboro Co., Illinois Testing Labs., Inc., Leeds & Northrup Co., C. J. Tagliabue Mfg. Co., Taylor Instrument Cos., and the Wheelco Instrument Co. Laboratory batch scales were displayed by the Exact Weight Scale Co., the Kron Co. and the Toledo Scale Co.

Several rubber manufacturers were also at the Exposition advancing their specialty products for the chemical industries. Both the American Hard Rubber and the Luzerne Rubber companies stressed their rubber tank linings for chemical equipment as well as their respective lines of hard rubber laboratory ware. The Garlock Packing Co. and the Johns Manville Co. exhibited their rubber and asbestos packings. The Great Western Mfg. Co. showed its extensive line of adhesives. Pioneer Rubber Co. displayed its neoprene work gloves and aprons. Mine Safety Appliances Co. exhibited its line of safety products and apparatus, much of which is of molded rubber.

Additional exhibits of interest to the rubber industry included the cutting knives displayed by the Robinson Mfg. Co. and the "Trans-Wrap" machine, for packaging materials in Pliofilm or cellophane, shown in the booth of the Stokes & Smith Co. Synthetic resin linings were featured by a number of exhibitors, including Maurice A. Knight, who also displayed the all-rubber shipping drums it has been marketing for a number of years. Chlorinated rubber finishes were shown by the Hercules Powder Co., sole makers of chlorinated rubber in this country, and by the Harrington Paint Company.

Still other interesting exhibits included that of the Sharples Solvents Corp. in which was shown the new diethyl amines, used as rubber accelerators, which were developed synthetically in this country. Butyl amines used for the same purpose have long been known, but the development of the synthetic di-ethyl amines has provided a supply for the American rubber industry to take the place of those formerly imported from Germany, according to attendants at the booth.

Dicalite, the mineral filler featured by the Dicalite Company, and which finds application in rubber compounding as a stiffening agent among other uses, was shown in the booth of that company. The "Traveling Laboratory" used by trouble-shooters of Foster D. Snell, Inc., the consultants, was exhibited by that concern.

All in all, there was a great deal to be seen at the 17th Exposition of Chemical Industries and, according to consensus of opinion, it was one of the finest yet held from the standpoints of attendance and actual business contracted. Charles Roth, head of the organization sponsoring the Exhibition, is again to be complimented on a job well done.

Anti-Gas Rubber Suit

An anti-gas suit recently placed on the market in England is made of beige-colored rubber. It has ski-type trousers and a hip-length blouse with attached hood. Wrists and ankles are tightly fitted to exclude gases and the rubber hood, in combination with the gas mask, completely covers the head.

Giant Firestone Tires

What are described as the largest tires ever produced by the rubber industry are now being manufactured in the Akron plants of the Firestone Tire & Rubber Co. Weighing more than 2,600 pounds each and capable of carrying a load of more than 36,000 pounds apiece, these tires are in regular production for use on the latest types of earth moving equipment. They stand more than 9 feet in height and have a cross section of approximately 3 feet. The tubes for these giant tires weigh 150 pounds each and the protecting flap more than 50 pounds.

TO USE CARBON BLACK IN ARCTIC PICTURES

Bombs of carbon black powder dropped on the snow from the map-making planes of the Third Antarctic Expedition will permit faster and more accurate overlapping of aerial photographs, necessary in claiming rights to Antarctic areas by the United States. A large quantity of uncompressed carbon black powder has been donated to the Expedition by the Continental Carbon Company.

Loading uncompressed carbon black aboard the North Star supply ship.

Packed in air-tight tins, the carbon black was loaded upon the *North Star*, supply ship of the U. S. Antarctic Service, commanded by Rear Admiral Richard E. Byrd, which left the U. S. Army Base at Boston for the frozen wastes on November 15th.

Both the plane carried atop the roof of the huge Snow Cruiser and the planes based at "Little America" will carry the black powder bombs on their aerial survey flights. Every few miles, just prior to taking a photograph, the planes will release a powder bomb which makes a big black splotch on the snow. When the photographs of the barren wastes are developed the black spots on the pictures will provide an accurate and quick method of piecing them together to form the aerial map.

Spotting of the ice and snow fields in this manner is necessary because there are practically no landmarks to identify a particular area—nothing but endless wastes of perpetual whiteness. In warmer climates, rivers, forests and towns appear sharply in aerial mapping photos, thus making it comparatively simple to piece the map together. During the long winter nights, the joint crews of both the Government Service and the Snow Cruiser, the latter a civil project of Research Foundation of the Armour Institute of Technology, will spend many evenings making the black powder into bombs, which will be exploded by light detonators.

The details for this interesting and novel use of carbon black were worked out by C. R. Johnson, technical director of the Continental Carbon Company in conjunction with Dr. Thomas C. Poulter, scientific director of the Research Foundation.

Obituaries

Frederick R. Wahl

Frederick R. Wahl, counsel and assistant secretary of the Goodyear Tire & Rubber Co., died at his home, 469 North Portage Path, Akron, Ohio, on November 16, at the age of 47, following an illness of several months. He joined the Goodyear organization in 1923 as head of the law department, succeeding C. F. Stone who went to the New York office, and was elected assistant secretary one year later.

A native of Milwaukee, Mr. Wahl received his education at the University of Wisconsin from which institution he received his A.B. degree in 1913 and his LL.D. in 1915. He served as judge advocate on the staff of a major general and held the rank of captain in the A.E.F. during the World War. After the war he served with his father's law firm, and later with the Newport Company and the Youngstown Sheet & Tube Company before joining Goodyear.

Mr. Wahl was known as a genial host and earned a reputation as an epicure who liked to cook. He was prominent in business and social circles in Akron and was a member of the Portage Country Club. Funeral services were held at his home on November 17. The body was cremated in Cleveland. He leaves a widow and a son and daughter.

James A. Murray

James A. Murray, president and treasurer of Goodyear Rubber Sundries, Inc., New Haven, Conn., died on November 10 at the age of 72 from a heart attack suffered at his home. Born in Bristol, Penna., he entered the employ of the Seamless Rubber Company at the age of 18 and later became vice-president and general manager of that organization. In 1916 he organized Goodyear Rubber Sundries and was president and treasurer of that company until his death. Mr. Murray was very much interested in police work and served as a member of the New Haven Board of Police Commissioners for nearly 30 years and its president for 9 years. He was also a member of many other civic commissions and once served a term as an alderman. He was an outstanding Catholic layman. Surviving are a son, James A. Murray, secretary and general manager of Goodyear Rubber Sundries, Inc., and a daughter, Mrs. Arthur J. Smith of New Haven.

John R. Stine

John R. Stine, who retired in 1933 as president of the Victor Balata and Textile Belting Company, of New York City, and Easton, Penna., died at his home, 135 Argyle Road, Brooklyn, N. Y., on November 8, after a long illness. He was 75 years of age. At the time of his death he was senior trustee of the Brevoort Savings Bank of Brooklyn, with which he was associated for 24 years. Mr. Stine was a member of the Montauk, Brooklyn and North Fork Country Clubs, and of the Stella Lodge, F. and A.M. He leaves a widow and three daughters.

Frank Zech

Frank Zech, prominent rubber broker of Akron, Ohio, was killed in a collision between an automobile and a railroad shuttle train in Akron on November 24. The train hit the automobile as it attempted to cross a grade crossing, and so terrific was the impact that the car was dragged 748 feet before the train could be halted. Mr. Zech had resided at the Akron City Club for the past 18 years and operated the Frank Zech Company from his rooms at the Club. He owned a farm near Medina, Ohio, where he generally spent his summers. Mr. Zech was a member of the Akron Elks Club and was also active in Shrine affairs. He was a bachelor. His mother survives.

S. Theodore Hodgman

S. Theodore Hodgman, former treasurer of the old Hodgman Rubber Company, when it was located at Tuckahoe, N. Y., died on November 26 in the French Hospital, New York City, after a brief illness. He was 68 years of age. Mr. Hodgman, who resided at 57 West 58th Street in New York City, was born in Tuckahoe and received his education at the Berkeley School and Columbia University. He was an active officer of the New York National Guard for many years. He leaves a widow, a son, and two daughters.

Wax Substitutes Available

Foreseeing the difficulties of obtaining certain waxes, glycerine, etc., due to war conditions abroad, the Glyco Products Co., New York City, has been working on a series of products to replace these materials. The company has now announced the availability of substitutes for carnauba wax, montan wax, beeswax, ozokerite, glycerine, etc. Further data is available from the company.

Good Year for Gillette

Gillette Rubber Co., Eau Claire, Wisconsin, manufacturer of bicycle and other tires, expects its profits in 1939 to exceed those of any other year, according to R. W. Hutchens, president of the firm. The plant is operating at near-capacity, with approximately 2,700 employed, the highest number on record.

Power Savings Seen

Operation of the "Compartment Car" built for the Brooklyn-Manhattan Transit System by the Clark Equipment Company and placed in operation in March, 1939, has indicated that extensive use of the new type, lightweight, rubber-cushioned car in place of older and heavier types of subway cars will result in substantial reduction in power costs for operation or permit substantial increases in schedule speeds without increase in power costs, according to a statement made by A. O. Williams, chief engineer of the Clark company, before a meeting of the New York Railroad Club held in New York City on November 16.

The use of a special duralumin perfected by the Aluminum Company of America and resilient rubber "sandwich" wheels designed by the B. F. Goodrich Company made it possible to reduce the new car 30% below that of older-type cars and thereby effect power-consumption savings estimated as high as $1,000,000 a year, Mr. Williams said. The construction of the "Compartment Car" was detailed in the March, 1939, issue of THE RUBBER AGE.

Krebs Expands Facilities

Plans for a major addition to its large titanium pigments plant at Edge Moor, Delaware, have been announced by the Krebs Pigment & Color Corporation. Construction work is expected to begin shortly and completion of the addition by the fall of next year is anticipated. The construction program will provide additional plant capacity for producing titanium dioxide and extended titanium pigments sold by Krebs to the rubber, paper, paint and other industries.

Drops Corporate Identity

The Calco Chemical Co., Inc., which has been a wholly owned subsidiary of the American Cyanamid Company since March, 1929, has ceased to be a separate corporation and in the future will operate as the Calco Chemical Division of the American Cyanamid Co. Operations will continue as in the past, with a separate organization for the manufacture, sale and service of the division's products, and no changes in personnel are contemplated.

Research Survey Started

Raymond Stevens, vice-president of Arthur D. Little, Inc., Cambridge, Mass., has been appointed director of a nation-wide survey of research in industry to be conducted for the National Research Council. The object of the survey, which has already been started, is to present an objective study of industrial research as a national resource as a means of aiding in its further development and utilization.

B. F. Goodrich Co. has announced that its line of Vulcalock cements, previously sold only under license agreements, has been released for sale on a restricted basis.

MARKETS

RUBBER—COTTON AND FABRICS—CHEMICALS

NEW YORK, DECEMBER 12, 1939

Crude Rubber

WAR conditions abroad were the principal factors affecting the changing prices of crude rubber since our last report. Moving erratically, for the most part, the price for spot on the Exchange swung in an 85 point range, low for the period being 19.75 on December 7 and high 20.60 on November 10. Dispelling of fears that rubber prices in England were to be fixed by official decree, caused the price to take a sharp upward movement in the past day or two, closing price for today (December 12) reaching 20.58. After dropping steadily from the high of 20.60 on November 10, the price jumped from 20.15 on November 21 to 20.50 on November 22, a 35 point gain, due to increased nervousness occasioned by the Dutch action on shipping and the large number of boats sunk during the preceding week off the English coast. The Dutch government cancelled sailings from Holland and it was believed this action would affect rubber shipments. Commission house liquidation brought the price under 20 cents in the first few days of December, but it is recovering rapidly as noted above. Quotations in the outside market, Exchange, London and Singapore, follow:

As of December 12

Plantations—

Ribbed Smoked Sheets—

No. 1 Spot	—	@	.20 5/16
April-June	—	@	.19½
No. 2	—	@	.20
No. 3	—	@	.19½
No. 4	—	@	.19¼
Thin Latex Crepe	—	@	.22¾
Thick Latex Crepe	—	@	.22¾
Brown Crepe, No. 1	—	@	.19½
Brown Crepe, No. 2	—	@	.19¼
Amber Crepe, No. 2	—	@	.19½
Amber Crepe, No. 3	—	@	.19¼
Brown Crepe, Rolled	—	@	.18½

Latex—

Normal, per lb., carload lots	—	@	.25¼

Paras—

Up-River, fine	—	@	—
Acre Bolivian, fine	—	@	.17½

Balata

Surinam sheet	—	@	.38

LONDON MARKET

Standard Smoked Sheets—Sellers—December 12

January-March	—	@	12 1/16d
April-June	—	@	12d

SINGAPORE MARKET

Standard Smoked Sheets—Sellers—December 12

January-March	—	@	10 7/8d
April-June	—	@	10 7/8d

Reclaimed Rubber

Demand for reclaim has shown a slight easing off in recent weeks from the high recorded throughout October and part of November. Reclaim consumption for October amounted to 18,955 long tons, or 34% of crude rubber consumption. There has been no change in the price structure since our last report. Current quotations follow:

Shoe

Unwashed	lb.	.06½	@	.06¾
Washed	lb.	.10	@	.10¼

Tube

No. 2 (Compounded)	lb.	.09	@	.10
Red Tube	lb.	.09	@	.09¼

Tires

Black (acid process)	lb.	.07	@	.07¼
Black, selected tires	lb.	.06	@	.06¼
Dark Gray	lb.	.09¼	@	.10
White	lb.	.12½	@	.14
Truck, Heavy Gravity	lb.	.05½	@	.06
Truck, Light Gravity	lb.	.07	@	.07½

Miscellaneous

Mechanical blends	lb.	.04½	@	.05

Scrap Rubber

(Delivered Akron Mills)

Demand for scrap rubber is reported to be steady. Dealers look forward to continued brisk business for the first quarter of the coming year. The price structure has changed slightly since our last report. Current quotations follow:

(Prices to Consumers)

Auto tire peelings	ton	24.00	@	25.00
Mixed auto	ton	13.50	@	15.00
Beadless tires	ton	17.00	@	18.00
Clean solid truck tires	ton	28.00	@	30.00
Boots and shoes	ton	20.00	@	21.00
Arctics, untrimmed	ton	15.00	@	16.00
Inner tubes, No. 1	lb.	.09	@	.10
Inner tubes, No. 2	lb.	.04 5/8	@	.04¾
Inner tubes, Red	lb.	.04½	@	.04¾

Cotton

Based on a number of favorable factors, chief of which was an unusual amount of active buying on straddle accounts from abroad, cotton prices have gone up considerably since our last report. From a low of 9.71 for middling uplands on the Exchange on November 15, the price climbed almost steadily until it reached 11.21, a gain of 150 points, today (December 12). Other factors contributing to the advancing price included reports of increased consumption of cotton in domestic mills, rumors that purchases of cotton were included in the plans of the Allies' buying commissions, strength in foreign markets generally, and announcement of the reduction of the export subsidy rate effective December 8. The price moved into still higher channels when the Government estimated production of cotton this season at 11,792,000 bales, a reduction of 53,000 bales from the figure estimated a month ago. A sharp rise in foreign markets was behind the upsurge on the Exchange today which brought the price to 11.21, a new high level. Quotations for middling uplands on the Exchange follow:

	Nov. 9	December 12*		
	Close	High	Low	Close
December	9.52	11.31	11.07	11.31
March	9.37	10.88	10.85	10.85
July	9.05	10.29	10.08	10.29

* New Contract.

Tire Fabrics

(Prices Net at the Mill)

Peeler, carded, 23/6/3	lb.	.32¾	@	.33
Peeler, carded, 23/4/3	lb.	.33¾	@	.34
Peeler, carded, 15/3/3	lb.	.30¾	@	.31
Peeler, carded, 15/4/2	lb.	.30¾	@	.31
Peeler, carded, 13/3/3	lb.	.29¾	@	.30

CHAFERS

Carded, American, 1 1/16"	lb.	.33	@	.33¼
Carded, America, 1"	lb.	.24	@	.31

Sheetings

48x40	36 in.	5.50	lb.	—	@	.04½
40x40	36 in.	6.15	lb.	—	@	.04¼
40x36	36 in.	6.50	lb.	—	@	.04⅛
48x48	40 in.	2.50	lb.	—	@	.09¼
48x48	40 in.	2.85	lb.	—	@	.08⅛
56x60	40 in.	3.60	lb.	—	@	.07¾
48x44	40 in.	3.75	lb.	—	@	.06⅜

Ducks

Enameling (single filling)	lb.	.25	@	.27
Belting and Hose	lb.	.30	@	—
Single filling, A grade	lb.	.11½	@	.12½
Double filling	lb.	.12½	@	.13½

Closing Rubber Prices on New York Commodity Exchange, Inc.

No. 1 Standard Contract of 10 Tons

FROM NOVEMBER 10TH TO DECEMBER 12

Date	Spot	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Sales
Nov. 10	20.60	20.45	20.45	19.30	18.97	18.65	18.41	18.20	17.98	17.75	17.75	17.60	17.60	——	123
11	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
12	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
13	20.60	20.45	20.45	19.48	19.13	18.78	18.54	18.30	18.07	17.85	17.75	17.70	17.70	——	73
14	20.30	20.15	20.15	19.30	19.02	18.75	18.50	18.25	18.04	17.83	17.75	17.75	17.75	——	101
15	20.18	20.00	20.00	19.12	18.81	18.51	18.30	18.10	17.90	17.70	17.65	17.60	17.60	——	118
16	20.07	19.91	19.91	19.10	18.78	18.46	18.15	17.85	17.70	17.55	17.50	17.45	17.45	——	209
17	20.08	19.96	19.96	19.18	18.84	18.50	18.24	17.98	17.81	17.65	17.55	17.45	17.45	——	67
18	20.08	19.95	19.95	19.18	18.86	18.55	18.30	18.05	17.85	17.65	17.55	17.45	17.45	——	16
19	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
20	20.08	19.91	19.91	19.10	18.89	18.68	18.36	18.05	17.91	17.75	17.65	17.55	17.55	——	49
21	20.15	20.05	20.05	19.20	19.04	18.88	18.64	18.40	18.20	18.00	17.82	17.65	17.65	——	64
22	20.50	20.45	20.45	19.70	19.50	19.28	18.97	18.66	18.47	18.28	18.12	17.95	17.95	——	188
23	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
24	20.50	20.40	20.40	19.60	19.49	19.37	19.05	18.72	18.59	18.45	18.20	18.05	18.05	——	162
25	20.50	20.35	20.35	19.60	19.51	19.43	18.99	18.76	18.55	18.35	18.20	18.05	18.05	——	35
26	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
27	20.50	20.22	20.37	19.72	19.54	19.37	19.02	18.68	18.46	18.25	18.12	18.00	18.00	——	157
28	20.25	——	20.18	19.52	19.35	19.19	18.82	18.45	18.25	18.05	17.95	17.85	17.85	——	175
29	20.08	——	20.00	19.30	19.07	18.85	18.57	18.28	18.03	17.78	17.74	17.70	17.70	——	269
30	20.20	——	20.10	19.40	19.13	18.85	18.53	18.30	18.08	17.85	17.76	17.65	17.65	——	98
Dec. 1	20.12	——	20.10	19.30	19.04	18.78	18.52	18.24	18.04	17.83	17.74	17.65	17.65	17.65	72
2	20.12	——	20.03	19.30	19.04	18.79	18.52	18.23	18.03	17.85	17.75	17.65	17.65	17.65	21
3	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
4	20.06	——	19.95	19.18	18.90	18.62	18.32	18.10	17.92	17.75	17.67	17.60	17.60	17.60	61
5	20.00	——	19.87	19.12	18.88	18.65	18.42	18.15	18.01	17.85	17.75	17.65	17.65	17.65	94
6	19.87	——	19.65	19.02	18.86	18.70	18.42	18.14	17.97	17.80	17.70	17.60	17.60	17.60	144
7	19.75	——	19.50	19.00	18.80	18.60	18.40	18.00	17.89	17.78	17.72	17.65	17.65	17.65	103
8	19.97	——	19.75	19.15	18.93	18.70	18.48	18.25	18.10	17.95	17.89	17.83	17.83	17.83	90
9	19.97	——	19.75	19.20	18.98	18.76	18.53	18.30	18.16	18.03	17.96	17.90	17.90	17.90	46
10	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
11	20.20	——	20.00	19.50	19.35	19.07	18.86	18.65	18.52	18.38	18.33	18.27	18.27	18.27	164
12	20.58	——	20.48	19.80	19.65	19.41	19.18	18.95	18.80	18.65	18.57	18.50	18.50	18.50	219

New York
December 12, 1939

Rubber CHEMICAL Markets

All Quotations F.O.B. Works Unless Noted

ACCELERATORS

Organic				
A-1 (Thiocarbanilid)	lb.	.24	@	.30
A-10	lb.	.31	@	.35
A-11	lb.	.52	@	.65
A-19	lb.	.52	@	.65
A-32	lb.	.70	@	.80
A-77	lb.	.42	@	.55
A-100	lb.	.42	@	.55
Aldehyde ammonia, crystals	lb.	.65	@	.70
Altax	lb.	.55	@	.65
Butyl Zimate	lb.	2.50	@	—
Captax	lb.	.50	@	.57
Crylene	lb.	.55	@	.65
paste	lb.	.45	@	.55
Di-Ortho-Tolyguanidine	lb.	.44	@	.46
Diphenylguanidine	lb.	.35	@	.45
El-Sixty	lb.	.50	@	.65
Ethyl Zimate	lb.	2.50	@	—
Ethylidene aniline	lb.	.42	@	.43
Formaldehyde aniline	lb.	.37½	@	.42
Guantal	lb.	.40	@	.50
Heptene	lb.	.35	@	.40
Hexamethylenetetramine	lb.	.33	@	—
Lead Oleate, No. 999	lb.	.14	@	—
Witco		.15	@	—
Lithex	lb.	.18	@	.20
Methylenedianiline	lb.	.36	@	.37
Monex	lb.	—	@	2.35
Oxynone	lb.	.64	@	.80
Phenex	lb.	.50	@	.55
Pip-Pip	lb.	2.50	@	—
Pipsolene	lb.	1.55	@	1.85
R & H 40	lb.	.40	@	.41
R & H 50-D	lb.	.42	@	.43
R-2	lb.	1.40	@	1.80
R-2 Crystals	lb.	2.50	@	2.75
R-23	lb.	.40	@	—
RN-2	lb.	1.40	@	1.80
RN-2 Crystals	lb.	2.00	@	2.25
Rotax	lb.	.60	@	.65
Safex	lb.	1.25	@	1.30
SPDX	lb.	.70	@	.75
Super-Sulphur No. 1	lb.	.50	@	—
No. 2	lb.	.18	@	.25
Thiocarbanilid, drums	lb.	.24	@	.30
Trimene	lb.	.55	@	.65
base	lb.	1.05	@	1.20
Triphenylguanidine	lb.	.45	@	—
Tuads	lb.	2.35	@	—
Ulto	lb.	1.50	@	1.75
Ureka	lb.	.60	@	.75
Ureka Blend B	lb.	.60	@	.75
Ureka C	lb.	.56	@	.65
Vulcanex	lb.	.42	@	.43
Vulcanol	lb.	.85	@	—
Zimate	lb.	2.35	@	—
Inorganic				
Litharge, domestic	lb.	.07	@	.07½
Magnesia, calcined, heavy	lb.	.04	@	—

COLORS

Blacks (See Compounding Materials)

Blues				
Prussian	lb.	.36	@	.37
Ultramarine	lb.	.15	@	—
Browns				
Mapico	lb.	.13	@	—
Umber, Turkey	lb	.04	@	.04½
Greens				
Chrome	lb.	.21	@	—
Chromium Oxide, bbl.	lb.	.21	@	—
Guignet's Green	lb.	.70	@	—
Reds				
Antimony crimson, 15/17	lb.	.45	@	—
sulfur, free	lb.	.48	@	.60
Indian English	lb.	.09	@	.10
Domestic (Maroon)	lb.	.11	@	—
Red oxide, pure	lb.	.10	@	.12
Rub-Er-Red, f.o.b. Easton	lb.	.09¼	@	—
Whites				
Cryptone, No. 19	lb.	.05¼	@	.05½
Cryptone CB, No. 21	lb.	.05¼	@	.05½
Cryptone, ZS-230	lb.	.07½	@	.07¾
Cryptone, ZS-86	lb.	.07½	@	.07¾
Lithopone				
Albalith, black label—11	lb.	.03¾	@	.04
Azolith	lb.	.03¾	@	.04
Ray-bar	lb.	.05½	@	.05¾
Ray-cal	lb.	.05¾	@	.05¾
Rayox	lb.	.13	@	.14
Titanox A	lb.	.13	@	.13¾
Titanox B	lb.	.05¼	@	.05½
Titanox C	lb.	.05¼	@	.05½
Zinc Oxide—American Process				
American Azo:				
ZZZ (lead free)	lb.	.06¼	@	.06½
Anaconda, lead free	lb.	.06¾	@	.06½
Horsehead Lead Free Brand:				
Special—3	lb.	.06¼	@	.06½
XX Red—4	lb.	.06¼	@	.06½
XX Red—72	lb.	.06¼	@	.06½
XX Red—78	lb.	.06¼	@	.06½
XX Red—103	lb.	.06¼	@	.06½
Kadox, black label—15	lb.	.06½	@	.06¾
Blue label—16	lb.	.06½	@	.06¾
Red label—17	lb.	.06½	@	.06¾
St. Joe, black label	lb.	.06¼	@	.06½
green label	lb.	.06¼	@	.06½
red label	lb.	.06¼	@	.06½
U. S. P.—7. bbls.	lb.	.09½	@	.09¾
Zinc Oxide—French Process				
Florence White seal—7 bbls.	lb.	.08¼	@	.08¾
Green seal—8	lb.	.08	@	.08¼
Red seal—9	lb.	.07½	@	.07¾
Yellows				
Cadmolith	lb.	.55	@	.65
Chrome	lb.	.14½	@	.15½
Mapico	lb.	.09½	@	—

BLACKS

(In bags, carload lots)

Aerfloated Arrow	lb.	.02425	@	—
Certified	lb.	.02425	@	—
Certified Spheron	lb.	.02425	@	—
Continental	lb.	.02425	@	—
Disperso	lb.	.02425	@	—
Excello	lb.	.02425	@	—
Fumonex	lb.	.03	@	—
Fumonex Beads	lb.	.03	@	—
Gastex	lb.	.03	@	—
Kosmobile	lb.	.02425	@	—
Kosmobile 66	lb.	.02425	@	—
Micronex (Amarillo)	lb.	.02425	@	—
Micronex Beads (Amarillo)	lb.	.02425	@	—
Pelletex	lb.	.03	@	—
P-33	lb.	.0475	@	—
Supreme	lb.	.02425	@	—
Thermax	lb.	.02	@	—
Wyex	lb.	.02425	@	—

COMPOUNDING MATERIALS

Aluminum Flake	ton.	21.85	@	24.50
Ammonia carbonate, lump	lb.	.10½	@	.12
Asbestine	ton	13.00	@	15.00
Barium carbonate (98-100%)	ton	—	@	—
Barium Dust	lb.	.05	@	.06
Barytes	ton	23.65	@	31.15
Bentonite	lb.	.02	@	.03
Blanc fixe dry f.o.b. works	ton	60.00	@	65.00
Calcene	ton	37.50	@	45.00
Catalpo (fact.)	lb.	.02	@	—
Chalk, precipitated				
Suprex white, extra lt.	ton	45.40	@	60.00
heavy	ton	45.00	@	55.00
Clay, Kaolin, domestic	ton	7.50	@	15.00
Aerfloted, Suprex	ton	9.50	@	21.00
Congaree	ton	9.50	@	—
Crown (f.o.b. plant)	ton	9.50	@	—
Dixie	ton	10.00	@	24.50
McNamee	ton	10.00	@	22.50
Par	ton	10.00	@	22.50
Witco	ton	9.50	@	—
Cotton Flock (Dark)	lb.	.10½	@	.13
Glues, extra white	lb.	.28	@	.30
medium white	lb.	.14	@	19
Kalite No. 1	ton	24.00	@	50.00
Kalite No. 3	ton	34.00	@	60.00
"Lime Crest" Industrial Filler No. 100	lb.	—	@	—
Magnesium carbonate	lb.	.07½	@	—
Mica	ton	35.00	@	44.00
Pyrax A	ton	6.00	@	20.00
Rottenstone (powdered)	lb.	.02½	@	.05
Soapstone, powdered	ton	16.00	@	22.00
Starch, powdered	cwt.	2.90	@	4.10
Talc, domestic	ton	25.00	@	45.00
Whiting, commercial	ton	17.00	@	18.00
Columbia Filler	ton	9.00	@	14.00
English Cliffstone	ton	33.00	@	43.00
Witco	ton	6.00	@	—
Wood Flour	ton	20.00	@	25.00
Zinc Carbonate	lb.	—	@	—
Zinc Stearate	lb.	—	@	—

MINERAL RUBBER

285°-300° Mineral Rubber	ton	21.00	@	42.00
Black Diamond	ton	25.00	@	—
Genasco, solid (factory)	ton	25.00	@	27.00
Hard Hydrocarbon	ton	21.00	@	42.00
Parmr, solid	ton	21.00	@	27.00
Pioneer, MR, solid	ton			
Pioneer-granulated	ton			

MISCELLANEOUS

Aromatics—Rodo #0	lb.	3.50	@	4.00
Rodo #10	lb.	4.50	@	5.00
Curodex 19	lb.	2.75	@	—
Curodex 188	lb.	3.50	@	—
Curodex 198	lb.	4.50	@	—
Para-Dor No. 5145	lb.	2.00	@	—
Areskleno No. 375 (dispersing, wetting and penetrating agent)	lb.	.35	@	.50
Darvan (dispersing agent)	lb.	.30	@	.47
Santomerse S (dispersing, wetting, penetrating and stabilizing agent)	lb.	.11	@	.25
Sunproof	lb.	.20	@	.25
Sponge Paste	lb.	—	@	.18
Tackol (tackifier)	lb.	.085	@	.18
Tonox	lb.	.52	@	.61

SOFTENERS

Acids				
Acetic, 28%, bbls. 100 lb.		2.53	@	2.78
Nitric, 36 degrees	cwt.	5.00	@	6.00
Sulfuric, 66 degrees	ton	15.50	@	16.50
Acids, Fatty				
Laurex	lb.	.10½	@	.13
SL #10	lb.	.12	@	.14
Stearex Beads	lb.	.08	@	.09
Stearic, double pressed	lb.	.12½	@	.13½
Stearite	lb.	.10½	@	—
Alkalies				
Caustic Soda, 76%	cwt.	2.70	@	3.55
Soda Ash, 58%, C.L.	cwt.	—	@	2.35
Oils				
Cycline Oil	gal.	.14	@	.20
Degras, bbls.	lb.	.07¾	@	.08
Fluxrite	lb.	.05½	@	.06½
Palm Niger	lb.	.05½	@	.06½
Para-Flux	gal.	.17	@	.18
Para Lube	lb.	—	@	.05
Petrolatum, light	lb.	.03½	@	.03¾
Pigmentaroil, tank cars	gal.	.16	@	—
in drums	gal.	.22½	@	.23½
Pine, steam distilled	gal.	.64	@	.69
Rosin Oil, cmpd	gal.	.40	@	—
Rubberol, f.o.b. Chicago	lb.	.13½	@	.14
Rubtack	lb.	.08	@	.10
Seedine, c.l.	gal.	.07¼	@	—
Tackol	lb.	.08½	@	.18
Witco Palm Oil	lb.	.07	@	—
Witco Softener No. 20	gal.	.20	@	—
Woburn No. 8, c.l.	lb.	.06	@	—
Wobonite, c.l.	lb.	.05	@	—
Resins and Pitches				
Pitch, Burgundy	lb.	.05½	@	.06½
coal tar	ton	19.00	@	22.00
hardwood	ton	16.00	@	22.50
pine, 200 lb. gr. wt.	bbl.	6.00	@	6.50
Pigmentar, tank cars	gal.	.16	@	—
in drums	gal.	.22½	@	.23½
R. S. L. Resin	lb.	—	@	—
Retort Pine Tar, drums	ton	20.00	@	26.00
Solvents				
Acetone, pure	lb.	—	@	.06¼
Alcohol, denatured, methanol, No. 1 bbls.	gal.	.33	@	.39
Benzene, 90%	gal.	.18	@	.23
Beta-Trichlorethane	gal.	—	@	.20
Bondogen	lb.	.98	@	1.50
Carbon, bisulfide	lb.	.05¼	@	.08
Carbon tetrachloride	gal.	.73	@	1.065
Dichlorethylene	lb.	—	@	.25
Dipentene, cml., drums	gal.	.41	@	.50
Ethylene dichloride	lb.	.05½	@	.06½
Plastogen	lb.	.07¼	@	.12
Reogen (drums)	lb.	.11½	@	.26
Rub-Sol (f.o.b. Okla.)	gal.	.09	@	—
Trichlorethylene	lb.	—	@	.08½
Turpentine, spirits	gal.	.43	@	.47
dest. dist., drums	gal.	.33	@	.41
Waxes				
Beeswax, white	lb.	.39	@	.45
Carnauba, yellow	lb.	.46	@	.47½
Ceresin, white, dom.	lb.	.08	@	.11
Montan, crude	lb.	.10¾	@	.11¾
Paraffin (c.l.—f.o.b. N. Y.)				
Yellow crude scale	lb.	.02¾	@	—
White crude scale 124/126	lb.	.02¾	@	.03
Refined, 122/127	lb.	.04½	@	—

ANTI-OXIDANTS

Agerite Alba	lb.	1.50	@	1.95
Exel	lb.	1.00	@	1.40
Gel	lb.	.57	@	.73
Hipar	lb.	.65	@	.92
Powder	lb.	.52	@	.64
Resin	lb.	.52	@	.64
Resin D	lb.	.52	@	.64
White	lb.	1.25	@	1.60
Albasan	lb.	.70	@	.75
Antox	lb.	.56	@	.58
B-L-E	lb.	.52	@	.61
Flectol B	lb.	.52	@	.65
Flectol H	lb.	.52	@	.65
Flectol White	lb.	.90	@	1.15
Neozone	lb.	.52	@	.63
Oxynone	lb.	.64	@	.80
Retardex	lb.	.35	@	.40
Santoflex B	lb.	.52	@	.65
Santovar A	lb.	1.15	@	1.40
S.C.R.	lb.	.33	@	.35
Stabilite	lb.	.52	@	.54
Stabilite Alba	lb.	.70	@	.75
VGB	lb.	.52	@	.61

MOLD LUBRICANTS

Aresklene	lb.	.35	@	.50
Cocoa Soapstock	lb.	.06	@	.08
Dipex	lb.	.06	@	.08
Lubrex	lb.	.2[illegible]	@	.30
Mold Paste	lb.	.12	@	.18
Rubberol, f.o.b. Chicago	lb.	.13½	@	.14
Rusco, f.o.b. Nitro	lb.	.12	@	.30
Sericite, f.o.b. N. Y.	ton	65.00	@	—
Soap Tree Bark, cut, sifted	lb.	.06	@	.08

FACTICE OR RUBBER SUBSTITUTES

Amberex	lb.	.17	@	—
Black	lb.	.08	@	.12
White	lb.	.08½	@	.12
Brown	lb.	.08	@	.10½
Neophax	lb.	.09¼	@	—

VULCANIZING INGREDIENTS

Dispersed Sulfur No. 2	lb.	.07½	@	.15
Sulfur Chloride, yellow (drs.)	lb.	.04	@	—
Sulfur flour,				
Refined, 100% pure (bags)	cwt.	2.50	@	3.65
Commercial (bags)	cwt.	1.60	@	2.35
Telloy	lb.	1.75	@	—
Vandex	lb.	1.75	@	—

Crude Rubber
Latex and Guayule
Reclaimed Rubber
Tires and Tubes

STATISTICS OF THE INDUSTRY

Rim Production
Automobiles
Gasoline
Cotton Prices

U. S. Imports and Exports of Crude Rubber

YEARS	Gross Imports: Long Tons	Gross Imports: Total Declared Value	Gross Imports: Average Declared Value per pound Cents	Re-exports: Long Tons	Re-exports: Total Declared Value	Re-exports: Average Declared Value per pound Cents	Net Imports: Long Tons
1924	325,899	173,367,272	23.75	10,309	6,057,637	26.23	315,590
1925	393,370	426,167,504	48.36	14,827	19,847,753	59.76	378,543
1926	409,944	501,131,064	54.57	17,671	22,470,583	56.77	392,273
1927	424,733	338,688,492	35.60	27,775	24,735,488	39.76	396,958
1928	432,633	242,727,423	25.05	32,159	18,128.761	25.17	400,474
1929	560,082	239,177,811	19.06	36,485	16,868,718	20.64	523,597
1930	482,083	139,133,048	12.88	30,205	9,310,205	13.76	451,878
1931	497,176	72,922,845	6.55	25,595	4,255,572	7.42	471,581
1932	409,556	31,936,459	3.48	20,930	2,015,612	4.30	388,626
1933	407,817	44,034,064	4.82	20,537	2,601,352	5.65	387,280
1934	449,513	97,929,676	9.73	23,848	5,770,109	10.80	425,665
1935	453,134	115,299,448	11.36	11,389	3,084,331	12.09	441,745
1936	467,064	152,072,496	14.54	12,581	4,488,223	15.93	454,483
1937	574,600	237,307,041	18.44	7,902	3,385,433	19.02	566,698
1938	397,620	125,357,730	14.07	5,652	1,799,124	14.21	391,968
1938:							
Oct.	33,449	10,945,896	14.61	621	196,523	14.14	32,828
Nov.	31,903	10,572,345	14.79	415	146,276	15.73	31,488
Dec.	36,031	12,601,926	15.61	424	141,364	14.87	35,607
1939							
Jan.	35,255	12,313,006	15.59	468	165,663	15.79	34,787
Feb.	29,109	10,269,224	15.75	460	152,113	14.76	28,649
Mar.	43,490	15,058,279	15.46	439	171,279	17.43	43,051
Apr.	30,836	10,400,125	15.06	440	151,644	15.38	30,396
May	42,998	15,041,433	15.62	496	180,091	16.20	42,502
June	32,437	11,403,150	15.69	413	147,910	16.00	32,024
July	34,288	12,071,805	15.72	440	164,428	16.69	33,848
Aug.	35,794	12,702,958	15.84	267	89,741	15.01	35,527
Sept.	35,006	12,667,740	16.16	1,472	659,055	19.98	33,534
Oct.	42,784	15,211,621	15.87	5,886	2,881,172	21.85	36,898

* Revised.

Note: "Gross Imports" do not include latex or guayule. To secure more accurate figures for "Net Imports" latex and guayule figures (shown below) should be added and the re-export figure deducted from the total. Annual figures for 1922, however, include both latex and guayule; guayule only is included in 1923. Annual figures for 1922-36 were revised in February, 1937.

United States Imports of Guayule, Balata, Jelutong, Liquid Latex

(All Quantities in Long Tons)

	Guayule Tons	Guayule Dollars	Balata Tons	Balata Dollars	Jelutong Tons	Jelutong Dollars	Liquid Latex (1) Tons	Liquid Latex (1) Dollars
1924	1,356	536,392	464	568,456	6,165	1,237,100	2,157	864,059
1925	3,781	1,803,448	517	574,750	6,749	1,642,531	3,272	3,537,510
1926	4,305	2,562,096	354	327,213	7,263	3,127,757	3,394	4,686,743
1927	5,018	2,674,957	582	477,246	7,785	2,448,657	1,495	1,170,650
1928	3,077	1,755,685	731	430,855	7,552	2,540,059	4,007	2,121,786
1929	1,275	545,175	728	566,964	8,204	2,458,126	3,729	1,788,391
1930	1,096	347,388	502	422,684	5,907	1,403,244	4,458	1,508,786
1931	....	.....	1,207	411,380	5,777	1,019,010	4,675	888,909
1932	....	.....	707	147,403	4,607	616,596	5,112	601,999
1933	....	.....	1,659	2,261,869	5,990	944,895	11,085	1,833,671
1934	398	75,349	1,054	438,209	4,987	943,752	13,107	3,643,221
1935	459	86,835	615	188,384	5,644	1,063,126	13,553	3,782,222
1936	1,229	286,552	535	199,368	6,163	1,296,364	19,852	6,659,899
1937	2,694	745,873	354	151,344	7,109	2,017,786	23,185	10,213,670
1938	2,485	623,819	509	181,140	9,132	2,944,504	11,878	4,147,318
1938:								
Oct.	126	27,692	45	20,641	614	163,635	876	347,348
Nov.	59	12,923	66	24,725	307	76,452	1,020	394,082
Dec.	181	39,869	13	6,263	917	237,653	1,263	479,966
1939:								
Jan.	226	49,580	61	20,417	843	203,753	1,602	599,927
Feb.	212	46,576	15	4,426	510	129,726	1,717	657,565
Mar.	229	39,520	14	5,215	641	136,112	2,005	731,302
Apr.	180	24,584	59	18,170	281	72,024	1,018	360,739
May	102	22,347	56	16,359	645	161,745	2,786	1,067,682
June	91	19,879	119	33,876	597	122,087	1,836	694,863
July	150	32,626	39	18,813	663	141,540	2,934	1,064,927
Aug.	178	38,687	28	8,689	742	208,156	2,614	1,001,013
Sept.	133	30,091	36	19,682	479	100,285	2,525	965,615
Oct.	282	61,376	107	43,267	465	127,084	2,555	968,207

(1) Weight given in pounds of dry rubber contained in latex.

Note: Annual figures for 1924-1936 revised on basis of information received on February 8, 1937.

U. S. Consumption of Crude Rubber

(Rubber Manufacturers' Association statistics raised to 100 per cent—All figures in long tons)

	Figures on Monthly Basis: 1932*	1933*	1934*	1935*	1936*	1937*	1938*	1939
Jan.	29,648	22,645	39,190	46,636	48,631	50,879	31,265	46,234
Feb.	31,821	21,392	40,515	42,720	36,841	51,950	25,357	42,365
Mar.	29,505	17,843	47,003	42,153	42,813	54,129	32,389	50,165
Apr.	27,518	25,928	44,853	44,247	52,031	51,859	29,730	44,166
May	30,957	44,074	42,918	41,101	50,612	51,795	30,753	44,377
June	41,475	50,743	40,147	36,156	52,772	51,860	32,540	47,259
July	29,976	49,614	32,553	35,917	48,250	43,703	34,219	43,880
Aug.	23,721	44,428	33,216	38,775	46,777	41,506	40,552	50,481
Sept.	23,847	35,281	30,258	37,086	46,449	43,945	40,183	50,150
Oct.	22,286	31,543	31,253	41,969	49,637	38,754	42,850	55,764
Nov.	23,231	28,831	34,748	42,310	50,433	34,025	49,050	54,322
Dec.	18,015	28,757	36,569	42,474	49,754	29,195	48,143	
Tot.	332,000	401,079	453,223	491,544	575,000	543,600	437,031	

* Revised.

Note: All figures are now based on Department of Commerce survey figures.

Reclaimed Rubber in the United States

(All Quantities in Long Tons)

Year	Production	Consumption: Tons	Consumption: % to Crude	Stocks*	Year	Production	Consumption: Tons	Consumption: % to Crude	Stocks*
1929	218,954	226,588	48.4	27,464	1934	110,010	100,597	22.2	23,079
1930	157,967	153,497	40.8	22,000	1935	122,948	113,078	23.0	25,069
1931	133,351	124,126	33.9	19,257	1936	150,571	141,486	24.6	19,000
1932	75,608	77,504	23.4	16,354	1937*	185,033	162,000	29.8	28,800
1933	99,560	81,602	19.9	20,746	1938*	122,403	120,800	27.6	23,000

1938:*	Figures on Monthly Basis: Production	Consumption: Tons	Consumption: % to Crude	Stocks*		Production	Consumption: Tons	Consumption: % to Crude	Stocks*
Jan.	8,303	7,463	23.9	28,982	July	7,668	8,777	25.6	18,956
Feb.	6,685	7,679	30.3	27,518	Aug.	11,295	11,387	28.1	18,307
Mar.	7,416	9,109	28.1	25,366	Sept.	12,961	11,969	29.8	18,540
Apr.	6,902	8,043	27.1	23,799	Oct.	14,624	12,522	29.2	19,910
May	7,406	8,613	28.0	22,042	Nov.	15,095	13,440	27.4	21,001
June	8,180	8,779	27.0	20,785	Dec.	15,868	13,019	27.1	23,000
1939:									
Jan.	13,763	13,000	28.1	21,960	July	12,588	13,542	30.9	21,339
Feb.	13,093	12,626	29.8	21,390	Aug.	17,214	16,846	33.4	20,645
Mar.	14,528	15,322	30.5	19,955	Sept.	17,990	16,953	33.8	21,185
Apr.	14,527	13,391	30.3	22,628	Oct.	20,896	18,955	34.0	21,829
May	14,769	13,517	30.5	22,771	Nov.	20,755	18,006	33.2	22,362
June	15,871	14,870	31.4	23,058	Dec.	.....	.....	...	.....

* Stocks on hand at the end of month or year.

* Revised.

Note: Figures for 1938 were revised on June 1, 1939, and are now based on Department of Commerce survey figures.

U. S. Consumption of Gasoline

(Bureau of Mines Statistics)
(In Thousands of Barrels of 42 Gallons)

	1937*	1938*	1939		1937*	1938*	1939
January	33,668	35,323	37,487	August	49,598	50,549	53,728
February	32,034	31,981	34,595	September	47,515	46,150	49,347
March	40,524	41,409	42,520	October	45,446	46,365	.....
April	43,461	43,430	43,977	November	42,718	45,084	.....
May	45,407	44,937	49,547	December	39,465	41,742	.....
June	48,447	48,383	49,812				
July	51,069	47,650	50,508	Total	519,352	523,003	.....

* Revised.

Rims Inspected and Passed in U. S.

(Tire and Rim Association Reports)

	Total		Total		Total
1927	19,700,003	1931	11,253,800	1935	18,664,356
1928	24,247,282	1932	6,261,336	1936	20,790,192
1929	24,141,502	1933	8,713,962	1937	22,257,964
1930	17,364,096	1934	12,255,118	1938	10,612,138

1939		1939		1939	
January ...	1,714,137	May	1,243,519	September .	1,585,300
February ..	1,442,535	June	1,019,626	October ...	1,882,190
March	1,730,211	July	681,434	November .	1,783,257
April	1,348,335	August	970,571	December .	.....

Daily Spot Closing Prices of Ribbed Smoked Sheet Rubber—*New York Market, in Cents per Pound*

Average Spot Closing Prices—Ribbed Smoked Sheets

(New York Markets)

Average Price per Pound for Years 1911-1931

Year	Cents	Year	Cents	Year	Cents	Year	Cents	Year	Cents
1912	121.60	1916	72.50	1920	36.30	1924	26.20	1928	22.48
1913	82.04	1917	72.23	1921	16.36	1925	72.46	1929	20.55
1914	65.33	1918	60.15	1922	17.50	1926	48.50	1930	11.98
1915	65.85	1919	48.70	1923	29.45	1927	37.72	1931	6.17

Average Monthly Price per Pound Since 1932

	1932 Cents	1933 Cents	1934 Cents	1935 Cents	1936 Cents	1937 Cents	1938 Cents	1939 Cents
Jan.	4.38	3.08	9.32	13.10	14.35	21.37	14.63	15.75
Feb.	4.03	2.95	10.45	12.92	15.48	21.33	14.71	15.93
Mar.	3.35	3.01	11.01	11.51	15.89	24.09	13.55	16.26
Apr.	3.02	3.56	12.10	11.55	15.98	23.44	11.84	15.87
May	3.09	4.95	13.26	12.05	15.62	21.14	11.57	16.07
June	2.66	6.15	13.51	12.57	15.85	19.29	12.57	16.37
July	2.89	8.01	14.60	12.10	16.49	18.86	15.37	16.51
Aug.	3.63	7.31	15.47	11.98	16.25	18.37	16.08	16.67
Sept.	3.84	7.30	15.36	11.55	16.46	18.55	16.15	21.24
Oct.	3.65	7.64	13.96	12.62	16.55	16.28	16.89	19.89
Nov.	3.44	8.66	13.04	13.15	17.97	14.60	16.24	20.21
Dec.	3.24	8.87	12.98	13.28	20.01	15.41	16.05	
Average for Year	3.49	5.96	12.92	12.37	16.41	19.39	14.64	

London Closing Prices of Ribbed Smoked Sheets

(In Pence Per Pound)

Day	1939 Sept.	1939 Oct.	1939 Nov.	1939 Dec.	Day	1939 Sept.	1939 Oct.	1939 Nov.	1939 Dec.
1	——	——	11 3/8	11 3/8	17	——	10 5/8	10 1/8	
2	——	9 5/8	11 1/16	——	18	9 3/4	10 1/2	——	
3	——	9 1/2	11 1/16	——	19	9 5/8	10 1/16	——	
4	——	9 1/16	——	11 1/16	20	9 1/2	10 1/16	11 1/16	
5	——	9 1/16	——	11 1/4	21	9 1/2	——	11 1/8	
6	——	9 1/2	11 1/16	11 1/16	22	9 1/2	——	11 3/8	
7	10	——	11 3/8	10 15/16	23	——	10 1/2	11 3/8	
8	9 1/2	——	11 1/16	11 5/8	24	——	10 5/8	11 1/2	
9	——	9 5/16	11 1/16	——	25	9 3/4	10 5/8	——	
10	——	9 5/16	11 5/8	——	26	9 3/4	10 1/2	——	
11	10	9 7/8	——	11 1/2	27	9 3/4	10 1/16	11 5/8	
12	10	——	11 1/16	11 7/8	28	9 3/4	——	11 5/8	
13	10	10 1/16	11 1/16		29	9 7/8	——	11 5/8	
14	9 3/4	——	11 1/16		30	——	10 7/8	11 1/2	
15	9 3/4	——	11 1/2		31	——	11 1/8	——	
16	——	10 1/8	10 13/16						

Average Monthly Price Per Pound

Month	1936 Pence	1937 Pence	1938 Pence	1939 Pence	Month	1936 Pence	1937 Pence	1938 Pence	1939 Pence
Jan.	6.758	10.378	7.077	7.926	Aug.	7.581	8.830	7.841	8.545
Feb.	7.255	10.503	7.029	7.942	Sept.	7.577	8.935	7.918	9.634
Mar.	7.450	11.766	6.590	8.120	Oct.	7.898	7.855	8.355	10.177
Apr.	7.502	11.471	5.793	7.910	Nov.	8.572	7.080	8.111	11.210
May	7.335	10.250	5.632	8.002	Dec.	9.580	7.332	8.005	
June	7.352	9.548	6.147	8.216	Average for Year	7.713	9.424	7.164	
July	7.696	9.136	7.464	8.271					

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market)

Recent Daily Price Per Pound

Date	1939 Oct.	1939 Nov.	1939 Dec.	Date	1939 Oct.	1939 Nov.	1939 Dec.	Date	1939 Oct.	1939 Nov.	1939 Dec.
1	——	9.18	10.30	11	9.18	——	10.85	22	——	9.93	
2	9.33	9.18	10.28	12	——	——	11.21	23	9.30	——	
3	9.22	9.37	——	13	9.17	9.82		24	9.35	9.94	
4	9.20	9.41	10.31	14	9.16	9.81		25	9.42	9.82	
5	9.17	——	10.33	15	——	9.71		26	9.36	——	
6	9.19	9.33	10.29	16	9.21	9.85		27	9.39	9.89	
7	9.16	——	10.53	17	9.22	9.83		28	9.31	9.97	
8	——	9.47	10.57	18	9.22	9.88		29	——	10.11	
9	9.09	9.60	10.69	19	9.28	——		30	9.34	10.16	
10	9.14	9.72	——	20	9.19	9.98		31	9.30	——	
				21	9.20	9.91					

Average Monthly Price Per Pound

	1936 Cents	1937 Cents	1938 Cents	1939 Cents		1936 Cents	1937 Cents	1938 Cents	1939 Cents
Jan.	11.91	13.06	8.57	8.94	Aug.	12.28	10.41	8.41	9.30
Feb.	11.53	13.15	8.91	8.97	Sept.	12.31	9.02	8.17	9.30
Mar.	11.43	14.46	8.92	9.00	Oct.	12.30	8.42	8.61	9.24
Apr.	11.71	14.23	8.76	8.87	Nov.	12.23	7.96	9.08	9.73
May	11.68	13.34	8.50	9.56	Dec.	12.83	8.26	8.72	
June	12.02	12.70	8.38	9.88	Average for Year	12.11	11.44	8.66	
July	13.11	12.26	8.85	9.71					

Stocks of Crude Rubber

(All figures are in long tons)

ON HAND OR AFLOAT TO THE U. S.

End of:	ON HAND 1937	ON HAND 1938*	ON HAND 1939	AFLOAT 1937	AFLOAT 1938	AFLOAT 1939	ON HAND AND AFLOAT 1937	ON HAND AND AFLOAT 1938*	ON HAND AND AFLOAT 1939
Jan.	204,436	276,497	237,826	55,096	57,356	48,210	259,532	333,853	286,036
Feb.	195,692	292,067	231,475	53,538	47,459	55,814	249,230	339,526	287,289
Mar.	192,980	301,762	205,936	56,994	41,882	55,981	249,974	343,644	261,917
Apr.	176,289	303,901	190,896	72,530	39,071	57,918	248,819	342,972	248,814
May	175,273	300,907	193,602	58,542	32,859	54,046	233,815	333,766	247,648
June	172,056	294,796	181,794	57,215	32,079	51,274	229,271	326,875	233,068
July	167,094	282,785	174,240	75,779	40,400	52,990	242,873	323,185	227,230
Aug.	174,195	273,841	161,362*	80,439	47,772	66,717	254,634	321,613	228,079*
Sept.	186,193	268,094	150,171	83,288	48,927	68,310	269,481	317,021	218,481
Oct.	200,025	259,074	133,183	80,653	51,062	100,500	280,678	310,136	233,683
Nov.	222,707	242,542	118,535	81,302	51,114	114,044	304,009	293,706	232,579
Dec.	262,204	231,500		63,099	45,105		325,303	276,605	

* Revised.

STOCKS IN GREAT BRITAIN

(No. of Tons in Wharves and Warehouses, not including Latex)

At end of	London 1937	London 1938	London 1939	Liverpool 1937	Liverpool 1938	Liverpool 1939
January	29,005	40,203	51,420	41,895	21,711	28,789
February	26,508	46,596	48,312	37,078	24,737	26,784
March	21,292	50,233	46,768	30,622	26,220	24,996
April	21,128	54,296	44,760	27,443	28,277	23,742
May	21,351	57,194	43,454	25,081	29,862	22,211
June	21,964	60,307	42,374	21,258	31,837	21,176
July	22,589	62,236	37,772	19,424	32,825	19,116
August	25,211	65,113	28,363	19,817	34,315	16,218
September	28,462	63,321		21,190	34,645	
October	30,465	59,609		21,327	33,483	
November	33,304	57,794		21,399	32,116	
December	35,633	55,668		21,978	31,012	

(Figures from the Rubber Trade Association of London)

STOCKS IN OTHER CENTRES

(Figures from Statistical Bulletin of the Int'l Rubber Regulation Committee)

	Penang and Singapore [1]	Malaya [2]	Ceylon [2]	Holland	Para and Manaos
At end of 1938					
September	35,386	53,815	5,339	662	1,599
October	34,901	54,720	4,916	669	1,796*
November	31,255	54,283	4,409	349	2,267
December	27,084	57,860	6,120	268	1,864
At end of 1939					
January	30,975	59,155	4,827	198	1,557
February	28,559	59,399	4,318	183	1,826
March	23,255	58,005	3,389	137	2,244*
April	22,434	55,238	3,648	131	2,209
May	20,849	52,837*	4,005	136	1,966
June	19,563*	55,834	3,771	101	1,821
July	27,042	55,948	4,217	188	1,474
August	20,570	50,625	3,134	315	1,914
September	23,482	52,755	2,742	...	2,682

[1] Dealers' and Port Stocks. [2] Inside Regulated Areas. [3] Dealers' Stocks Only.
* Revised.

RUBBER STOCKS AFLOAT

	Afloat for United States	Afloat for Europe	All Other * Afloat	Total * Afloat
End of: 1938				
August	47,772	34,500	18,728	101,000
September	48,927	29,200	17,873	96,000
October	51,062	26,100	21,838	99,000
November	51,114	26,700	14,186	92,000
December	45,105	26,800	8,095	80,000
End of: 1939				
January	48,210	27,900	28,890	105,000
February	55,814	28,300	21,886	106,000
March	55,981	25,200	20,819	102,000
April	57,918	27,200	13,882	99,000
May	54,046	25,700	16,254	96,000
June	51,274	25,260	11,466	88,000
July	52,990	31,000	21,010	105,000
August	66,717	30,000	23,283	120,000
September	68,310	30,000	18,690	117,000

* *Total Afloat* is an arbitrary estimate based on 1½ months' shipments as adopted by the Department of Commerce. *All Other Afloat* is determined by subtracting the amount of stocks in transit to the United States and Europe from the estimated total.

TOTAL PRINCIPAL WORLD STOCKS

(Figures from the Survey of Current Business)

At End of:	1934	1935	1936	1937*	1938*	1939
January	661,948	698,153	600,479	454,249	549,762	497,665
February	663,308	686,195	599,355	445,265	565,833	479,578
March	666,382	678,809	583,318	447,856	586,666	460,723
April	658,796	677,006	567,172	428,249	586,291	438,252
May	689,239	677,569	541,871	413,134	568,158	429,979
June	672,804	671,525	520,255	434,250	573,136	407,640
July	676,200	679,061	519,074	445,782	580,654	418,639
August	674,702	680,644	500,520	457,462	565,394	400,428
September	694,361	661,509	493,585	470,768	551,447	382,508
October	680,616	655,000	486,159	479,398	540,976	.....
November	684,408	617,300	466,491	493,266	512,196	.....
December	705,975	613,987	466,576	545,533	482,852	.....
Monthly Avge.	677,395	666,397	528,738	460,022	555,280	.....

* Revised.

U. S. Tire and Tube Statistics[1]

(All Figures Represent Thousands)

AUTOMOBILE CASINGS

Production Figures on Quarterly Basis

Quarter	1932	1933	1934	1935	1936*	1937*	1938*	1939
Jan.-Mar.	11,004	6,635	13,437	13,355	11,376	15,565	7,532	13,702*
Apr.-June	12,980	14,412	13,565	12,597	14,892	15,834	8,353	13,490*
July-Sept.	9,245	14,707	9,822	11,312	14,914	12,207	11,240	15,109*
Oct.-Dec.	6,856	9,550	10,406	12,099	14,858	9,704	13,052	
Total	40,085	45,304	47,230	49,363	56,040	53,310	40,182	

Shipment Figures on Quarterly Basis

Quarter	1932	1933	1934	1935	1936*	1937*	1938*	1939
Jan.-Mar.	8,760	6,981	10,730	11,154	10,554	14,143	7,534	12,156*
Apr.-June	18,021	15,139	14,998	13,473	15,940	15,741	10,363	14,968*
July-Sept.	8,141	13,707	11,648	13,489	14,037	13,106	11,748	15,745*
Oct.-Dec.	5,329	8,265	9,310	12,066	12,855	10,495	12,685	
Total	40,251	44,092	46,686	50,182	53,386	53,485	42,330	

Inventory Figures [2]

Quarter	1932	1933	1934	1935	1936*	1937*	1938*	1939
Jan.-Mar.	9,878	7,290	11,651	11,675	8,762	12,004	10,521	10,248*
Apr.-June	4,999	6,615	10,219	10,755	7,556	12,081	8,470	8,909*
July-Sept.	6,096	7,595	8,419	8,288	8,690	11,200	8,022	8,364*
Oct.-Dec.	7,644	8,888	9,455	8,196	10,717	10,383	8,451	

Figures for Recent Months

	PRODUCTION 1937	PRODUCTION 1938	PRODUCTION 1939	SHIPMENTS 1937	SHIPMENTS 1938	SHIPMENTS 1939	INVENTORY [2] 1937	INVENTORY [2] 1938	INVENTORY [2] 1939
Oct.	3,846	4,183	5,431	3,807	4,126	5,188	11,228	8,237	8,657
Nov.	3,006	4,139	....	3,640	4,405	....	10,572	7,924	....
Dec.	2,852	4,729	....	3,048	4,154	....	10,383	8,451	....

AUTOMOBILE INNER TUBES

Production Figures on Quarterly Basis

Quarter	1932	1933	1934	1935	1936*	1937*	1938*	1939
Jan.-Mar.	10,721	6,230	12,823	12,553	11,891	15,831	7,314	12,385*
Apr.-June	11,913	13,001	13,191	11,631	14,624	15,413	7,380	12,067*
July-Sept.	8,286	14,356	10,321	11,270	15,320	12,038	10,794	13,505*
Oct.-Dec.	5,970	9,000	9,891	12,425	15,201	9,092	12,360	
Total	36,890	42,587	46,226	47,879	57,036	52,374	37,848	

Shipment Figures on Quarterly Basis

Quarter	1932	1933	1934	1935	1936*	1937*	1938*	1939
Jan.-Mar.	8,918	6,539	10,640	11,252	11,367	14,606	7,387	11,371*
Apr.-June	16,271	13,292	14,553	11,928	15,113	15,495	9,564	13,233*
July-Sept.	7,761	13,370	11,545	13,251	15,069	12,901	11,243	14,758*
Oct.-Dec.	4,961	8,189	8,306	11,636	12,874	9,765	12,099	
Total	37,911	41,390	45,044	48,067	54,423	52,767	40,239	

Inventory Figures [2]

Quarter	1932	1933	1934	1935	1936*	1937*	1938*	1939
Jan.-Mar.	9,448	6,369	10,244	10,406	8,660	11,993	10,547	9,163*
Apr.-June	5,174	6,097	8,795	10,050	8,075	11,833	8,337	8,044*
July-Sept.	5,753	7,008	7,639	7,565	8,595	11,326	7,859	7,846*
Oct.-Dec.	6,749	7,815	9,180	8,231	10,945	10,312	8,166	

Figures for Recent Months

	PRODUCTION 1937	PRODUCTION 1938	PRODUCTION 1939	SHIPMENTS 1937	SHIPMENTS 1938	SHIPMENTS 1939	INVENTORY [2] 1937	INVENTORY [2] 1938	INVENTORY [2] 1939
Oct.	3,800	3,980	5,073	3,525	4,101	5,012	11,185	7,746	7,717
Nov.	2,891	4,029	....	3,359	4,138	....	10,605	7,665	....
Dec.	2,400	4,351	....	2,881	3,859	....	10,312	8,166	....

[1] Based on reports received from the Rubber Manufacturers Association.
[2] Held by manufacturers at end of period indicated.
* Revised.

Automobile Production

	United States Total	United States Passenger Cars	United States Trucks	Canada Total	Canada Passenger Cars	Canada Trucks	Grand Total
1928	4,357,384	3,826,613	530,771	242,382	196,737	45,645	4,599,944
1929	5,358,420	4,587,400	771,020	263,295	207,498	55,797	5,621,715
1930	3,355,986	2,814,452	540,534	154,192	125,442	28,750	3,510,178
1931	2,389,730	1,973,090	416,640	82,621	63,477	19,144	2,472,351
1932	1,370,678	1,135,493	235,187	60,816	50,718	10,098	1,431,494
1933*	1,920,057	1,573,512	346,545	65,924	53,855	12,069	1,992,126
1934*	2,753,111	2,177,919	575,192	116,852	92,647	24,205	2,869,963
1935*	3,946,934	3,252,244	694,690	172,877	135,562	37,315	4,119,811
1936*	4,454,115	3,669,528	784,587	162,159	128,369	33,790	4,616,274
1937*	4,808,974	3,915,889	893,085	207,463	153,046	54,417	5,016,437
1938	2,489,635	2,000,985	488,650	166,142	125,081	41,061	2,655,777
1939							
Apr.	337,372	273,409	63,963	16,891	12,791	4,100	354,263
May	297,508	237,870	59,638	15,706	11,585	4,121	313,214
June	309,720	246,704	63,016	14,515	10,585	3,930	324,235
July	209,343	150,738	58,605	9,135	5,112	4,023	218,478
Aug.	99,368	61,384	38,484	3,475	1,068	2,407	103,343
Sept.	188,751	161,625	27,126	3,921	3,494	427	192,672
Oct.	313,377	251,819	61,558	9,640	7,791	1,849	323,017
Nov.	.....	.....	.....	.....	.....	.....	.....
Dec.	.....	.....	.....	.....	.....	.....	.....

* Revised.
Note: U. S. figures represent factory sales; Canadian figures represent production.

Exports of Crude Rubber from Principal Producing Countries

(Long Tons)

	BRITISH MALAYA [1]								NETHERLAND INDIES [4]						
	Gross Exports	Imports	Net Exports	Ceylon [2]	India & Burma [3]	Sarawak [3]	British North Borneo [3]	Siam [3]	Java & Madura	Sumatra E. Coast	Other N. I.	Indo-China [3]	Amazon Valley	All Other [3]	World Total [6]
1923	252.016	70,432	181,584	39.971	6,416	5,705	4,237	1,718	32.930	46.344	57.822	5.067	16.765	7.856	406.415
1924	259.706	108.524	151.182	39.997	7.697	6.699	4,621	2.962	42.446	54.497	80.347	6.688	23.165	9.065	429.366
1925	316,825	158,022	158,803	49,566	10.082	5,424	5.377	5.377	46.757	65.499	120.626	7.881	25.298	13.797	514.487
1926	391,328	151,243	240,085	58,962	9,874	9,155	6,079	4,027	52.186	71.413	121.231	8.203	24.298	16.017	621.530
1927	371.322	182.845	188.477	55.356	11.321	10.923	6.582	5.472	55.297	77.815	142.171	8.645	28.782	15.633	606.474
1928	409,430	149,787	259,643	57,267	10,790	10,087	6,698	4,813	58.848	82.511	121.770	9.548	21,129	10.690	653.794
1929	574.836	163.092	411.744	81.584	11.663	11.077	7.381	5,018	65.990	87.789	134.037	9.696	21.148	6.767	853.894
1930	547.043	133.876	413,167	76.970	10.782	10.309	6.781	4.251	69,735	79,396	115.254	7.665	14.260	5.651	814.241
1931	519,740	125.506	394.234	61.769	8.470	10.451	6.247	4.218	75.952	87,747	116.009	11.696	12.121	3.292	792.203
1932	478.252	92.539	385.713	48.973	3.888	6.960	4.664	3.451	61.312	79.837	85.871	13.883	6.450	1.816	702.818
1933	573,412	167.377	406.035	63.351	4,527	10.874	7,555	7.765	73.851	91.861	149.659	18.394	9.883	2.737	846.312
1934	677.361	211.803	465.558	79.746	10.492	17.233	11.103	17.545	87.400	112.058	175.470	20.170	8.903	2.985	1,008.663
1935	590,319	174.652	415.667	54.316	13,968	19,465	8.885	28.327	57,488	78.325	139.297	28.816	11,275	8,745	864.574
1936	520.286	167.799	352.487	49 692	14.724	21.243	8,177	33.702	61.307	84.577	152.205	40.782	14,193	11.466	845.431
1937	681.638	213,446	468.192	70,353	17.015	25.922	13.213	5,551	84,085	139,632	207,863	43,399	15,576	13,063	1.133.864
1938	526,911	156,101	370,810	49,528	15,178	17,792	9,512	41,080	57,526	94,501	145,909	58,518	14,618	12,920	887,692
1938:															
June	42,258	14,394	27,864	3,693	1,318	2,441	643	3,904	4,519	7,788	12,120	4,776	718	818	70,602
July	43,689	18,713	24,976	3,861	1,083	4,057	937	4,710	6,808	8,271	19,955	5,139	625	1,063	79,485
Aug.	47,246	13,735	33,511	4,401	953	965	728	4,793	4,757	7,339	11,006	3,840	1,050	1,074	74,417
Sept.	40,992	10,586	30,406	3,990	1,036	756	284	3,893	4,026	7,052	9,092	8,139	758	1,292	70,724
Oct.	42,294	16,599	25,695	4,893	1,111	1,612	1,075	4,438	4,486	8,229	17,166	3,638	1,796	1,092	75,231
Nov.	39,340	10,219	29,121	6,422	1,271	929	567	3,223	3,975	5,678	9,568	4,035	1,159	990	66,938
Dec.	32,901	7,607	25,294	3,212	1,586	599	227	3,029	1,873	4,332	4,315	9,815	2,205	1,021	57,508
1939:															
Jan.	43,332	19.049	24,283	7,237	1,879	2,342	1,604	2,918	6.787	11,261	20,630	4,739	1,708	1,200*	86,588
Feb.	43,084	13,889	29,195	5,495	1,565	1,484	664	5,606	4,833	8,410	11,658	5,659	1,056	1,200*	76,825
Mar.	43,259	14,035	29,224	3,718	1,393	1,177	344	5,401	5,361	8,084	14,428	4,636	1,331	1,200*	76,297
Apr.	43,668	13,996	29,672	2,225	1,260	2,446	1,687	2,660	5,321	9,250	13,691	2,581	1,139	1,200*	73,132
May	42,214	12,697	29,517	2,807	1,678	1,649	558	2,782	4,105	8,159	12,009	4,585	874	1,200*	69,923
June	31,341	9,567	21,974	3,708	1,452	1,157	332	1,748	5,839	8,846	12,754	4,630	591	1,200*	64,231
July	45,962	20,052	25,910	5,018	1,291	3,092	1,603	5,599	5,229	11,020	19,325	3,367	1,019	1,200*	83,673
Aug.	53,497	12,635	40,862	5,686	427	1,749	975	5,230	6,236	10,010	11,232	7,020	1,000	1,200*	91,627
Sept.	45,094	18,302	26,792	6,149	785	1,932	429	4,496	5,168	10,278	22,197	6,040	1,000*	1,200*	86,466
Oct.	70,839	21,493	49,346	5,179	822	2,487	1,730	2,807		44,591		5,000*	1,000*	1,200*	114,162

All figures from January, 1934, onward are net exports shown on a "dry rubber" basis as calculated by the International Rubber Regulation Committee. (1) Prior to January, 1934, Malayan net exports cannot be taken as production, since imported rubber is largely wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex also is not included in the early years, which on a dry rubber basis was as follows: 1924—1,117 tons; 1925—3,618; 1926—3,263; 1927—2,439; 1928—2,247; 1929—3,574; 1930—2,750; 1931—1,940; 1932—5,193; 1933—10,470, and 1934—14,172 tons. (2) Ceylon Chamber of Commerce statistics until 1926; rubber exported as latex is not included—such shipments on a dry rubber basis were: 1923—18 tons; 1924—90; 1925—6; 1926—20; 1927—½; 1928—1; 1929—2; 1930—11; 1931—2; 1932—2; 1933—1, and 1934—6 tons. (3) Official statistics. (4) Exports from "Other N. I." are chiefly wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included in earlier years, which is as follows on a dry rubber basis: 1923—2,342 tons; 1924—1,008; 1925—2,239; 1926—44; 1927—84; 1928—1,395; 1929—437; 1930—2,744; 1931—3,874; 1932—3,488; 1933—5,260, and 1934—5,330 tons. (5) Calculated from official import statistics of principal consuming countries; also includes United States imports of guayule. (6) This total includes the third column for British Malaya and all other figures shown for other territories. (*) Figure is provisional.

NOTE: ANNUAL FIGURES ARE MORE ACCURATE; THEY ARE REVISED AT THE END OF THE FOLLOWING YEAR.

Net Imports of Crude Rubber into Principal Manufacturing Countries

(Long Tons)

	United States [1]	United Kingdom	France (h)	Germany	Canada (ac)	Japan (da)	Italy	Russia (ce)	Australia (cd)	Belgium (d)	Netherlands	Scandinavia (abcdf)	Spain (g)	Czechoslovakia (abcd)	World Total
1919	238,407	42,671	17,685	5,584	6,395	9,753	9,894	75	1,002	3,995	2,771	3,149	2,418	9	343,808
1920	249,530	56,844	13,885	11,890	11,746	5,297	6,123	62	1,815	3,840	5,510	2,292	2,008	567	371,409
1921	179,736	42,087	15,135	21,920	8,124	21,713	3,906	165	1,014	1,705	1,022	1,279	2,245	569	300,620
1922	296,594	11,724	24,352	27,546	9,207	15,934	6,430	2,493	2,643	172	—3,807	1,778	589	567	396,222
1923	301,527	12,700	27,392	18,519	13,277	15,372	8,489	2,986	1,649	2,184	792	2,528	630	1,128	409,173
1924	319,103	—11,550	30,446	22,727	14,299	19,571	8,764	2,346	3,124	2,688	—807	3,178	944	1,370	416,203
1925	385,596	4,061	32,956	33,937	19,683	11,117	11,412	7,088	4,757	2,930	875	3,149	1,155	1,558	520,274
1926	399,981	84,865	34,240	22,773	20,229	18,125	9,809	6,529	9,021	2,498	2,670	4,646	1,299	1,870	617,957
1927	403,472	60,249	14,271	38,892	26,405	20,521	11,381	12,018	9,490	6,482	636	4,224	2,055	2,672	632,768
1928	407,572	4,846	36,498	37,855	30,447	25,621	12,433	15,134	8,430	7,958	2,243	4,418	3,178	3,138	599,771
1929	528,608	122,675	55,093	49,275	35,453	34,284	17,169	11,774	15,886	9,445	3,022	6,440	864	4,650	894,638
1930	458,036	120,069	68,503	45,488	28,793	33,039	18,639	16,387	5,354	10,635	2,924	7,710	2,400	4,468	822,445
1931	475,993	86,170	46,466	39,688	25,261	43,483	10,149	30,671	7,649	11,009	2,220	6,360	2,605	7,717	794,641
1932	393,844	44,086	42,506	43,121	20,917	56,027	14,469	30,637	12,576	9,519	2,851	7,262	4,359	9,444	693,618
1933	398,365	73,335	61,953	54,120	19,332	66,831	19,341	29,830	13,534	11,166	1,243	7,831	5,520	10,402	772,803
1934	439,172	158,482	49,560	59,330	28,439	69,905	21,398	47,271	9,642	9,115	3,758	12,418	6,900	10,999	926,389
1935	455,758	128,829	51,450	62,899	26,870	57,567	21,880	37,572	9,978	7,593	4,068	11,878	8,140	11,245	895,727
1936	475,359	—2,591	57,032	71,794	27,871	61,223	16,534	30,967	14,109	9,648	2,888	11,236	6,668	8,772	791,510
1937	592,394	92,707	59,871	98,170	36,088	62,311	24,733	30,462	19,164	14,970	4,343	4,680	2,400	13,663	1,055,356
1938	406,343	133,079	59,660	90,200	25,696	45,836	28,170	25,650	11,944	11,309	5,092	16,034	2,400	9,936	871,349
1938:															
June	26,429	14,053	4,542	7,478	3,243	2,145	2,399	505	805	853	663	1,149	200*	988	65,452
July	22,209	12,678	5,433	6,927	2,685	3,099	3,641	541	1,215	1,106	528	1,151	200*	635	62,048
Aug.	31,494	12,891	3,662	7,190	1,832	2,033	2,078	739	1,182	1,238	259	965	200*	595	66,358
Sept.	34,436	8,100	5,094	7,390	1,405	3,584	1,799	1,725	1,779	519	385	1,830	200*	608	68,854
Oct.	33,830	3,085	3,791	6,326	3,139	3,204	3,921	2,000*	1,780	848	420	3,022	200*	9	65,575
Nov.	32,567	936	5,322	7,275	3,123	4,665	1,984	4,000*	660	636	530	1,209	200*	379	63,486
Dec.	37,051	4,134	5,820	7,481	2,198	4,000	2,355	2,500*	647	876	263	1,013	200*	648	69,186
1939:															
Jan.	36,614	836	4,684	7,227	2,867	2,553	2,133	4,000*	910	898	454	1,037	200*	1,131	65,544
Feb.	30,578	4,773	5,315	7,569	1,451	3,263	2,025	2,000*	1,741	1,068	184	858	200*	524	61,549
Mar.	45,286	8,082	4,503	8,036	2,458	4,019	1,525	2,000*	1,316	1,242	368	1,133	200*	463	80,631
Apr.	31,590	4,752	5,639	8,719	1,466	3,579	1,926	2,000*	1,108	855	333	1,062	200*	597	63,826
May	45,390	7,531	4,646	8,413	3,006	4,438	1,573	2,000*	1,188	792	518	1,654	200*	618	81,967
June	33,951	8,439	4,649	8,190	2,423	3,067	1,992	2,000*	1,308	621	672	2,703	200*	487	70,702
July	36,932	4,040	4,282	8,437	3,164	3,668	1,350	1,000*	1,422	859	565	824	200*	412	67,155
Aug.	38,319	2,044	4,000*		2,033	3,145	1,500*	2,000*	2,182	952	651	1,546	200*	400*	
Sept.	36,197	4,406	4,000*		2,492	9,254	1,500*	2,000*			222				
Oct.	39,724														

a—Including gutta percha. b—Including balata. c—Re-exports not deducted in monthly statistics. d—Including some scrap and reclaimed rubber. e—Official statistics of rubber imports by Soviet Russia. f—Including Norway, Sweden, Denmark and Finland. g—United Kingdom and French exports to Spain except in years prior to 1925. h—French imports have been reduced in order to eliminate imports of gutta percha and to reduce to basis of net weight. [1]—United States imports of guayule are included in this compilation. *—Figure is provisional; final figure will be shown when available.

NOTE: ANNUAL FIGURES ARE MORE ACCURATE: THEY ARE REVISED AT THE END OF THE FOLLOWING YEAR.